Railway Age

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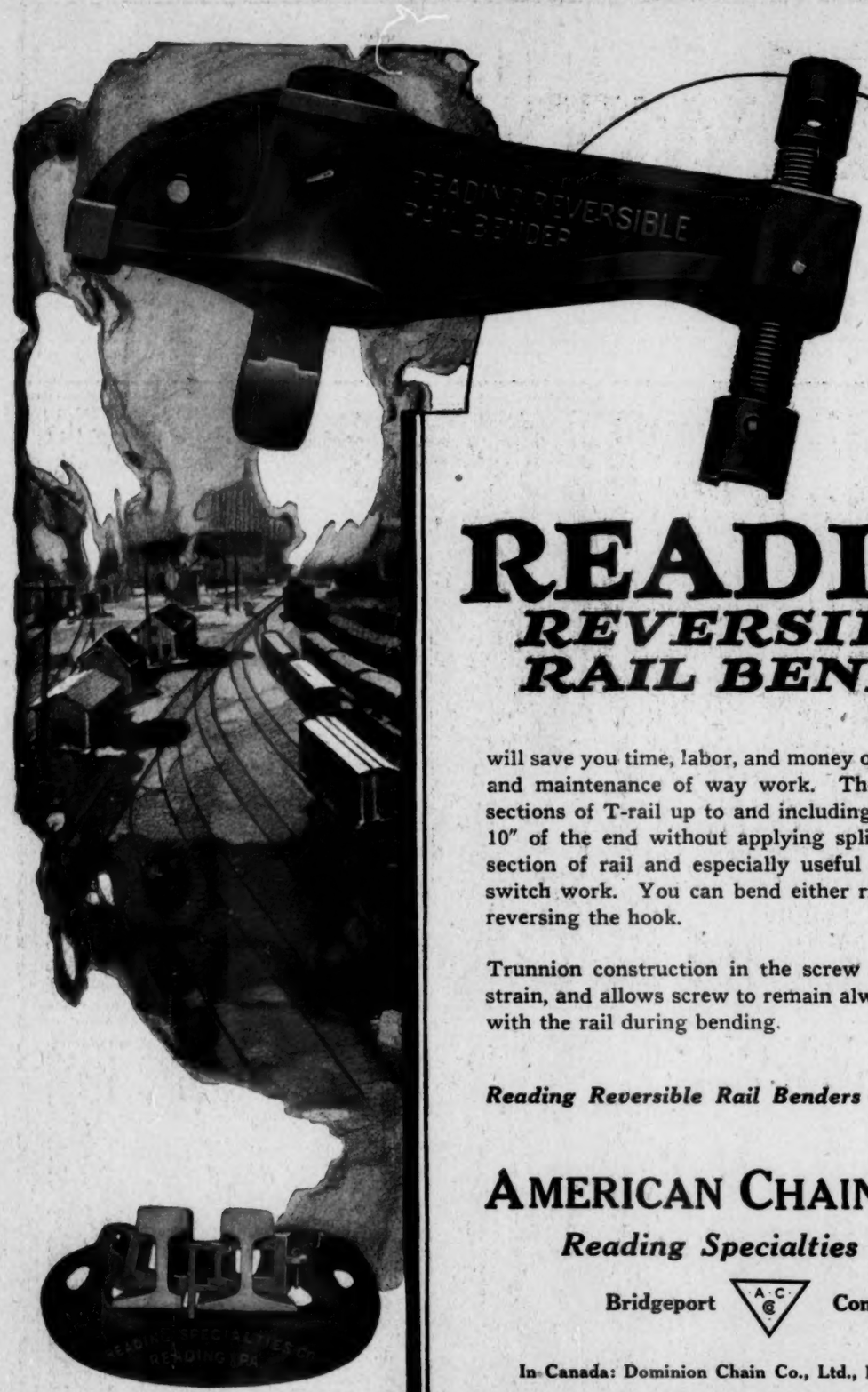

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makes for better and safer transportation. It acts as a shock absorber, eliminates strain on yoke and prevents pulling in of stock rail at this point. The wide end construction of yoke prevents clamp from slipping from its right angle position.

EDITORIAL

Railway Age

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Foreign Cars on the D. & H.

The Delaware & Hudson rules for handling foreign freight cars, reprinted on another page, have justified themselves as a means of economy, and they therefore deserve "preferred attention" at a time when everybody is paying particular attention to savings. Such a code—a code in which every word has an important meaning and yet which clerks are constantly tempted to read hurriedly—is, however, worthy of most careful study if only as one important element in making simple and easy the scores or hundreds of studies in routing which a large yard office may have to make every day. "Studies" is the proper word, though each study may take but a minute; for accuracy is of the first importance, and the country is now so big that the old time yardmaster who kept the whole freight route map of the United States in his head, is pretty nearly extinct. The Delaware & Hudson's combination home route card and empty-car waybill is a sensible device by which Mr. Roberts expects to save thousands of dollars yearly, as compared with the cost of providing separate forms for these two functions.

Where Are the Greatest Leaks?

The peculiar situation of the New England carriers and the necessity for giving them adequate relief has caused F. J. Lisman, the investment banker, to attempt to outline a method of getting at the exact cost of handling different commodities in order that there may be a fair division of earnings between the carriers. A situation of this kind naturally leads to a realization of the leaks and losses in railway operations. We are fortunate in being able to present elsewhere in this issue a frank discussion by Mr. Lisman of what, in his opinion, are the great wastes in railroad operation and how they may be remedied. It seems hardly necessary to remind our readers of Mr. Lisman's extensive experiences with railroad properties or to emphasize his fitness for making a study of this kind. He hits some things pretty hard—L. C. L. freight, for instance—and he also suggests a permanent remedy for labor trouble. That he questions the advisability of consolidating railroad properties beyond a reasonable point is clearly indicated in his comments on the elimination of competition. Incidentally, Mr. Lisman invites free and frank criticism of his suggestions and will be disappointed if our readers do not take advantage of this invitation.

A Conclusive Demonstration

Because of the many factors which enter into the consideration of some of the problems of railway operation, it is often difficult for the officer to develop any effective demonstration of the economies accruing from policies or improvements which he has initiated. So many independent variables are generally involved that it is hard to prove that they have not vitiated his calculations. Occasionally, however, the results obtained are so overwhelmingly conclusive that the influence of the other factors pale into insignificance and almost any reasonable allowance for any possible effect which they may have still leaves a large saving to the credit of the improvement, policy or practice under consideration. As a case in point, a certain railroad in the west, in the face of a rapidly rising market, in 1917, bought a two-years' supply of boiler flues on the basis of the average consumption at that time. Since then only a very small number of flues have been bought to take care of certain special needs and yet today after four years, on the basis of the present consumption of flues, this road still has more than two-years' supply on hand. This remarkable reduction in flue consumption on this railroad must be ascribed almost entirely to one condition—the reorganization of the administration of locomotive water supply and treatment on this road at about the time that the flues were purchased in 1917. The case is particularly significant because the saving is not the result of any large capital expenditures. Instead it must be explained by the minute supervision which the water supplies have received under which each case has been solved as an independent engineering problem without any attempt to apply some favorite panacea. It is true that many water softening plants are in service on the road in question and that others will no doubt be installed from time to time, but the important fact is that the use and treatment of water is under the supervision of a staff that knows its business and has the confidence of the management.

Is "Bigness" an Insuperable Obstacle?

The president of a large company performing a transportation service for the railways at an important terminal offered as an explanation of the ability of his company to render this service to the roads at a cost less than that for which they could perform it themselves the fact that his officers had an intimate knowledge of every detail of these operations and exercised the closest supervision over them. As a result this company has been able to arrive at the actual cost of each step in these operations. With this information as a basis it has endeavored to reduce its costs in various ways. For example, from the figures which it has collected, it has been able to arrive at the normal amount of time required for various operations and to establish a wage bonus for special performance above this base, thereby stimulating the employee by giving opportunity to increase his earnings. That this has been beneficial is indicated by the fact that the bonus payments run into thousands of dollars weekly. By these same performance records the company can detect and eliminate the shirker, thereby raising the average efficiency. Of equal importance is the fact that the cost of each operation is known in detail on the following morning, thereby bringing unfavorable influences to the attention of the management immediately upon their appearance and affording an opportunity to correct or eliminate them. What this company has done for its own private interest in serving the railways, the railways should be able to do for themselves. One of the most serious handicaps under which the roads are laboring is that of ignorance of the cost of many of their operations. As a result too little attention is given by the average railway officer to unit costs and almost every road is performing many services which are costing more than they would if

data were presented promptly to the officers which they could use in detecting leaks and stopping them. It is said frequently that a railway is so large and its operations so complicated that it is not possible for data of this character to be compiled. If, in performing a transportation service for the railways, a private company finds that it is to its financial advantage to prepare information of this character, it would seem that the railways themselves should be able to so decentralize their accounting as to secure equally valuable results in the various branches of their operations.

Labor Unions Defy the Labor Board

IT IS evident the general public greatly misunderstands the situation with regard to the national agreements. Many newspapers continue to print statements to the effect that the abrogation of the agreements will save the railroads $300,000,000 a year. The national agreements have not really been abrogated. They were to have gone out of existence on July 1, but they are still in full force and effect because the labor organizations have openly defied the Railroad Labor Board by completely disregarding the spirit and purpose of its decision in the national agreements case, in consequence of which the board has suspended its abrogation order.

These so-called national "agreements" as they exist today are not "agreements" in any sense whatever. They were made by the Railroad Administration with certain labor unions under government control. The railway companies had no part in making them. They never agreed to the rules incorporated in them and the Transportation Act plainly contemplated their abrogation on September 1, 1920. The Labor Board, however, ordered them continued until it could hold hearings and render a decision regarding it. The labor leaders put forth every effort to protract the hearings and get the objectionable rules and working conditions continued.

The Railroad Labor Board finally ordered the national agreements abrogated July 1 and, subject to certain principles it laid down, remanded negotiation of new rules and working conditions to the individual railways and their employees. Among the principles it recognized was that of the eight-hour day. This automatically rendered impossible probably one-half of the savings it had been estimated could be made by restoring the rules and working conditions of 1917. The decision of the board necessarily was a condemnation by it both of the rules and working conditions incorporated in the national agreements and of national rules and working conditions in themselves. The very essence of it was recognition of the principle that rules and working conditions should be made by the individual railways and their own employees in order that they might vary from road to road and thereby be adapted to local conditions.

The first thing the national labor leaders did after the board's decision was rendered was to order the chairmen of their committees on the individual railways to demand continuance practically unchanged of every rule in the national agreements. The local chairmen did this and stuck to it. Of course the railways could not individually accept the rules in the national agreements. This would have been to have left in effect all the rules which have caused the great inefficiency and enormous waste which have resulted from the national agreements. It would have prevented the adaptation of rules and working conditions to local situations and would have disregarded the decision of the Labor Board.

The open defiance of the Labor Board by the national labor leaders, aided and abetted by the local chairmen, has thrown the entire subject of rules and working conditions back into the hands of the board. In these circumstances there are several courses open to the board. It can attempt to write uniform rules and working conditions for all the railways of the United States. Doubtless it would eliminate some of the more indefensible features of the national agreements. The result, however, would be the application of the same rules and working conditions to all the railroads of the country regardless of local conditions. The board might attempt to write separate rules for each railway. This would improve the existing situation very little indeed.

But neither the Labor Board nor any other body of men is competent to write rules for each individual railway. This would be practically an interminable process. No body of men can know enough about local conditions to do this.

Another course open to the board is to recognize the plain intent of the Transportation Act and proceed accordingly. The Transportation Act plainly intended that when the railways were returned to private operation they should be managed as individual units. It was to get away from policies adopted under government control in furtherance of nationalization of the railways that they were returned to private operation. Only by abandoning these policies could a return to private operation do any good. The most costly and indefensible policies adopted under government control were those for the standardization of wages and rules and working conditions. The Railroad Labor Board might carry out the plain purpose of the Transportation Act by restoring the rules and working conditions of 1917 with such specific exceptions as it may regard as fair and in the public interest.

So far as actual results are concerned, the labor leaders thus far have been completely victorious in the fight over national agreements. The Conference Committee of Managers of the railways presented to the board detailed evidence and concrete examples regarding the operation of the present rules sufficient to convince any fair and rational person of their iniquitousness and that they are imposing a heavy and indefensible burden upon the railroads and the public. This evidence convinced the board itself so completely that it ordered the national agreements abrogated. Nevertheless, the national agreements are still in effect and unless the board has the courage to act as the provisions of the Transportation Act and the logic of the situation dictate the labor leaders will so manœuver that they will be in effect for months to come.

Failure of the individual railways and their employees to reach agreements regarding the rules and working conditions is entirely due to the persistent pursuit by the labor leaders of a policy obviously intended to perpetuate the very rules and working conditions which the Labor Board by its decision has condemned. The situation demands prompt, intelligent and courageous action by the Labor Board. Only by such action can it vindicate the wisdom of Congress in creating it.

Running Weak Cars a Wasteful Practice

FEW problems affecting railway operation and maintenance are completely encompassed within the bounds of a single department. It is unfortunate that in the solution of these problems the departments having primary jurisdiction often have little recourse except to settle them on the basis of only those factors which come within the scope of their own operations. An important aspect of the continued operation of cars of weak construction is the effect which these cars have in increasing loss and damage claims, in causing wrecks and accidents and in otherwise delaying traffic, all of which add materially to the operating expenses. But these considerations, being beyond the jurisdiction of car department officers, do not receive the weight which their importance deserves in the establishment of policies with respect to the retirement or rehabilitation of these cars.

The cost of renewals and maintenance are the only factors concerning which the car department officers can speak with

full authority. It is doubtful, however, if full consideration were given to these two factors alone whether these cars would long be continued in service. If adequate consideration were given to the reduction in the direct cost of maintenance which rehabilitation or replacement with new equipment would make possible, would not the cost of rehabilitation or retirement be found to be one of the most lucrative investments open to the railroads at the present time? An investigation made by one railroad a few years ago disclosed the fact that the retirement of a large number of cars of all-wood construction, and their replacement with new cars of steel or steel underframe construction, would effect a saving in maintenance alone which in five years it was estimated would amount to about 68 per cent of the entire cost of the new equipment. When adding the service value of the car days saved by the less frequent appearance of the equipment on the repair track and in the shop, the combined saving was estimated to be practically 80 per cent of the total cost of the new equipment. After taking into account the accrued depreciation on the retired cars, the total saving in maintenance cost and in car days for five years amounted to about 130 per cent of the additional capital required plus the interest, depreciation and renewal charges.

How many other investments offer a return which will not only pay the carrying charges but will more than retire the principal in a five-year period? A thorough study of the economics of freight car maintenance and operation today would lead to equally startling conclusions with respect to the 300,000 or 400,000 weak and unsuitable freight cars which are still in service.

Labor's Restriction of Production

IT SEEMS NOT improbable the historian of the present age will treat as one of its most extraordinary phenomena the persistent efforts made by working men through labor unions to prevent improvement and cause deterioration of the living conditions of the working man and his family. To many persons this statement will sound paradoxical, but it refers to a policy of the labor unions, the inevitable tendency of which should be obvious to every person of intelligence.

The Railroad Labor Board ordered the national agreements abrogated effective on July 1, but has found it necessary to suspend its order. The labor leaders caused the rules and working conditions incorporated in the national agreements to be presented to each individual railway and insisted that they be accepted practically without modification. This made agreement between individual railways and their own employees impossible. Not only is this a defiance of the Labor Board, but it has afforded a striking illustration of the main policy being followed by many labor organizations—that of using every means available to restrict production.

The fundamental objection to practically all the bad rules in the national agreements is that they are intended to reduce, and have the effect of reducing, the efficiency of labor. Labor works with machinery and tools furnished by the employer. Rules, working conditions and practices which reduce the efficiency of labor reduce, or tend to reduce, the output of each worker and of the machinery and tools he uses. It follows that the railway labor unions are engaged in a struggle to reduce the amount of transportation service produced in proportion to the number of men employed and the amount of machinery and tools used.

The same thing is being done in almost every industry where labor is organized. The labor leaders seek to restrict the number of bricks laid by each man and thereby the number of houses built. They seek to restrict the amount of coal mined by each miner and thereby the amount of coal produced. They seek to restrict the number of shirts, suits of clothes and shoes made by each worker, and thereby the total number of shirts, suits of clothes and pairs of shoes made.

It is easy to understand many things the labor unions do. It is easy to understand why they seek advances and oppose reductions in wages; the incomes of all classes of people are the subject of constant negotiation, and, other things being equal, the most aggressive and skillful negotiators get the largest incomes. It is easy to understand why labor unions for years have sought reductions in the hours of work. Sufficient leisure to rest, enjoy the society of one's family and friends, read and sleep is desired by every normal man. Probably without some kind of organization working men would not get reasonable hours of work and enough money wages to buy their share of the necessaries, comforts and luxuries of life, which constitute their true compensation for the work they do. But why does almost every labor union constantly try to restrict, even within the limits of a reasonable working day of eight hours, the amount of work men do, and in consequence the output of industry? Who lives in most of the houses built, eats most of the food produced, wears most of the clothing made, and directly or indirectly uses most of the transportation service rendered? Those who work with their hands. What are the effects of restriction of outputs? First, to restrict or reduce the amount of these things produced; second, to increase their cost and the prices that must be paid for them, thus necessarily and unavoidably restricting the amount of them which working people can get and pay for.

Obviously, it is just as easy for working people to get a fair division of a large product as of a small product. Obviously, if the total product of industry is restricted by inefficiency the amount of the total product labor will get will be smaller than the amount it would get if production were not restricted.

Nevertheless labor unions persist in their policy of restriction of output, and then complain loudly about the inevitable results of it. They restrict the construction of houses and apartment buildings in cities and complain because places to live are scarce and rents are high. They restrict the amount of work done by each railway employee, and then complain because railway operation is expensive and rates are high. They restrict the production of clothing and shoes, and then complain that they cannot buy more clothes and shoes because the prices are high.

In view of such rules and working conditions as the labor unions have got adopted on the railroads and in the building trades, and the still more unreasonable and restrictive rules they constantly seek, one wonders how long it would take labor organizations to destroy modern industrial civilization if there were not employers and leaders of public opinion with intelligence and courage enough to resist and combat them. Many of the labor leaders are men of intelligence and ability in certain respects. There are grafters and scoundrels among them, but a large majority are honorable men. Why, then, do a great majority of them advocate and persistently struggle for methods and principles which if logically carried out would reduce production in this and other progressive countries to an amount per capita no greater than it is in China and bring about the same condition of chronic starvation among working people here which prevails there?

There must be among the numerous labor leaders in this country at least a few who know that there never yet was a house lived in, or a pound of flour eaten, or a shirt worn which was not first produced, and that in the long run labor itself is the chief beneficiary of increased production and the chief sufferer from restriction of production. If there are such labor leaders we have not heard of them giving practical recognition to the fact mentioned by discouraging restriction and encouraging increase of production. The amount of time and energy devoted by labor leaders to attempts to reduce production is beyond intelligent comprehension.

Illinois Central

THE *Railway Age* essays in the course of a year to analyze in its editorial columns the operations of some 50 odd railroad properties. In its reviews the attempt must be made to make them both informative and interesting. This particular part of the task, in so far as the last two or three years has been concerned, has not been as simple as might appear. It has been to a certain extent difficult to get away from a tendency towards monotony and equally as difficult to point out the differences which characterize one property as compared with another. Nearly every one of the country's railroads has been subjected to the same influences which have been so often referred to in these columns, namely, a great increase in gross earnings, a still greater increase in expenses and the resulting decline in net. The difference as between the roads in this respect has been one of degree rather than of kind and the problem has been to say the same thing in different ways and with different figures in a manner which will prove sufficiently distinctive and, as mentioned above, sufficiently informative and interesting.

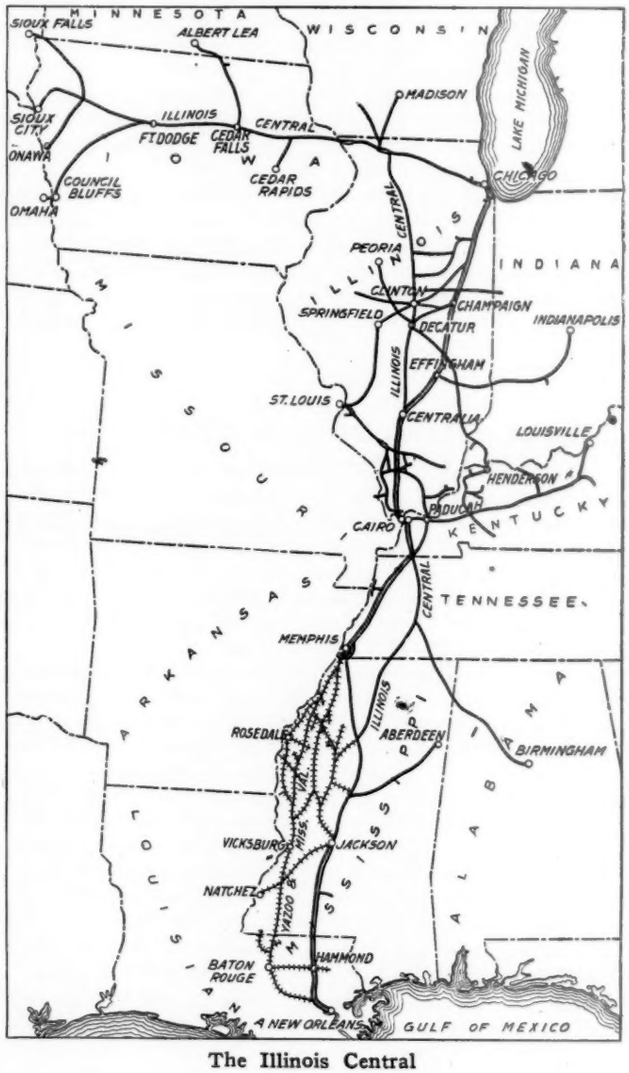
In reviewing the operations of a railroad, it is extremely desirous, in fact necessary, to point out insofar as possible what lies ahead, in other words, to indicate if possible what the property may be expected to do in the future. This in itself is also difficult. So much depends upon the Interstate Commerce Commission, upon the Labor Board, upon Congress, upon the President and the administration, and upon the trend of business conditions in general that the future of the railroad seems in large measure to depend less upon what the property will do than upon what the agencies of the government and what industry may do. The railroad's problem is thus subordinated to the entire transportation problem in a degree much greater than has been the case in former periods of trial and stress.

The question naturally arises as to what all this may have to do with the Illinois Central. In that road we have what appears to be somewhat of an exception, to an extent sufficient at least so that in its case one may safely attempt to look forward into the future with the realization that it is in rather a preferred position. Naturally, the fortunes of this property will rise or fall with those of the steam railway carriers in general, but such is the character of the property and of its management, that whatever progress may be made in the general situation will be reflected in special degree in its operations and earnings.

When one's mind turns to the subject of efficiently operated railroads, one of the first carriers that comes to mind is the Illinois Central. This is true not only of students of the railway problem, but of shippers, whose opinion, in these days of restored competitive service, is of equal or greater importance. The Illinois Central today is supplying a service the character of which is bettered by no other carriers and equalled by but few. On the one hand, it furnishes a highly satisfactory fast freight service which delivers traffic in Chicago 62 hours after it leaves New Orleans. On the other, because of efficient management combined with the fact that 45 per cent of its total tonnage is bituminous coal, it secures an average train load considerably in excess of the averages secured on the roads about it. Its suburban service out of Chicago ranks with the best in the country. There are few roads in the country so many of whose officers rank with the leaders in their various departments.

As in the case of certain of the other efficiently operated carriers, such as the Lackawanna, Burlington, etc., efficient operation on the part of the Illinois Central was not sufficient to enable it to overcome the handicaps of federal control and the high wage scales of government control and Decision No. 2 of the Railroad Labor Board. The road received a rental from the government of $16,282,374 annually. In 1918 it earned for the government a net railway operating income of $12,907,466 and in 1919, $4,191,796. In 1920, it was one of the few roads which increased its net over the 1919 figure, the net railway operating income according to the December monthly report to the Interstate Commerce Commission, being $6,914,198. The claim against the government covering the guaranty period has been set at $19,499,887. The Illinois Central, in short, was not a good money maker for the government for the federal control and guaranty periods.

At present the road is not carrying as much traffic as it carried in the first few months of last year. Because it is receiving higher rates on this traffic than it was in the same period of 1920 its gross earnings have been larger. Severe economies have cut down expenses so that in spite of the falling off in traffic, the net railway operating income in the first four months of 1921 was $6,766,895 as compared with $4,867,033 for the period from January 1 to April 30, 1920.



The Illinois Central

The traffic carried by the Illinois Central in 1920 was the largest in its history. In 1920 it handled 49,233,079 tons of revenue freight, the total revenue ton-mileage being 13,724,232,886. The revenue tonnage carried in 1919 was 38,245,714; in 1918, the busiest year previous to 1920, it was 45,853,934 and the revenue ton-mileage, 12,441,047,707. The road secured an average haul on its traffic of 279 miles in 1920 as compared with 261 miles in 1919 and 271 miles in 1918.

There is little question but that one of the best indications of efficiency in operation is revenue train loading, not only as compared with the records secured by other roads handling a like traffic, but more particularly as compared with the road's own records for previous years. One of the features of the Illinois Central's operations has been the marked and steady increase in its train load over a period of years. In 1920 its average revenue train load was 660 tons and the increase since 1916 has been no less than 110 tons. The figures for the various years are as follows: 1916, 550 tons; 1917, 623 tons; 1918, 639 tons; 1919, 649 tons. A similar progressive increase in car loading is also evidenced. The average number of tons of all freight in each loaded car in 1920 was 30 tons. In 1916, it was 24 tons; in 1917, 27 tons; in 1918, 29 tons; in 1919, 27 tons. Another leading figure is that of net ton-miles per car day, which was in 1920, 805, an average exceeded by but few roads in the country. The car miles per day in 1920 were 40.9.

It is quite to be expected that the road will not be able to continue the increase in the various averages into 1921 with the sharp falling off in traffic which has taken place. However, 1921 will not be without its progress. During 1920 the road placed orders for 150 locomotives, some of which will be used presumably on the Yazoo & Mississippi Valley. These orders included 100 heavy 2-10-2 or Santa Fe type locomotives. With them the road should be able to make further marked progress in its efforts to secure increased train loading and increased operating efficiency. To take care of the new locomotives, roundhouse stalls were extended and 100 ft. turntables were put in at the engine terminals at Centralia, Ill., Clinton and Freeport and stalls were extended at Amboy and Paducah.

The Illinois Central was allocated 3,500 coal cars by the Railroad Administration. During 1920 it also placed orders for 1,000 refrigerator, 300 stock and 200 flat cars and for 55 passenger train cars. It should hardly be necessary to bring in any more facts to show in what excellent shape from the standpoint of equipment the Illinois Central should be in to handle efficiently the business which will be offered to it when the much hoped for revival in business takes place.

In conclusion, the Illinois Central during the period of federal control and during the guaranty period did not earn its standard return or its guaranty, respectively; in fact, came far from so doing. Its efficiency of operation was not enough to enable it to overcome the handicaps of high wage scales, the national agreements and other elements characteristic of the uncertain period which all railroad men hope is now nearing its close. However, the period has been characterized by no inconsiderable amount of progress, which remark is particularly true as applied to 1920. Like the Burlington, the Lackawanna and certain other roads which might be mentioned, the Illinois Central is prepared for the future. It is in a particularly good situation to take advantage of any revival of business that may develop and it will naturally be materially assisted by any improvements that take place in the railway situation as a whole.

The operating results in 1920 as compared with 1919 are as follows:

	1920	1919
Mileage operated	4,799	4,793
Freight revenue	$101,360,641	$71,477,112
Passenger revenue	26,630,148	23,936,298
Total operating revenue	145,547,858	107,886,835
Maintenance of way expenses	29,034,954	19,595,657
Maintenance of equipment	42,028;103	29,897,946
Traffic expenses	1,377,250	947,429
Transportation expenses	66,301,718	45,384,834
General expenses	3,469,692	3,044,555
Total operating expenses	143,208,180	99,262,712
Net revenue from operation	2,339,678	8,624,123
Taxes	7,613,102	6,057,868
Operating income	Def. 5,304,235	2,532,407
Net railway operating income	Def. 1,321,720	2,986,964

The corporate income account is as follows:

	1920	1919
United States Government—guaranty period claim	$19,499,887	.....
Rental from United States Railroad Administration	3,399,635	$17,896,467
Net from railway operations	18,522,085	16,691,635
Total non-operating income	7,219,882	7,634,005
Gross income	25,741,967	24,325,639
Total deductions from gross income	12,170,845	12,156,720
Net income	13,571,122	12,168,919
Income balance transferred to credit of profit and loss	13,434,841	11,880,619
Dividends (7 per cent)	7,650,720	7,650,720

Southern Pacific

THE SOUTHERN PACIFIC system operates, exclusive of the lines in Mexico, 11,152 miles of railroad. The distinguishing feature of the Southern Pacific, however, is not so much its size—there are a number of railway systems in North America which rank with it—as it is what may aptly be termed its versatility. The company's lines extend from Portland, Ore., and from Ogden, Utah, to San Francisco, Calif., thence to Los Angeles, and from there eastward to El Paso, Tex., and New Orleans, La., combined with which the company operates steamship lines from Galveston, Tex., and New Orleans to New York.

The system traverses eight states and over half the width of the country. On the line from Ogden to San Francisco, at Summit, Calif., where it crosses the Sierra Nevada range, it reaches a height above sea level of 7,018 feet. At Salton, on the edge of the Salton Sea in southern California, the line is 264 feet below sea level. In eastern Texas and southern Louisiana the region is characterized by its heavy rainfall; in the Imperial Valley of southern California, there is no rainfall at all; in the one place the problem in bringing land under cultivation is most likely to be drainage, the other's extraordinary fertility can only be utilized by irrigation. Northeast of San Francisco the road maintains with greatest difficulty a line across the Suisun marshes; in other parts of California the difficulty confronting operation is moving sand hills.

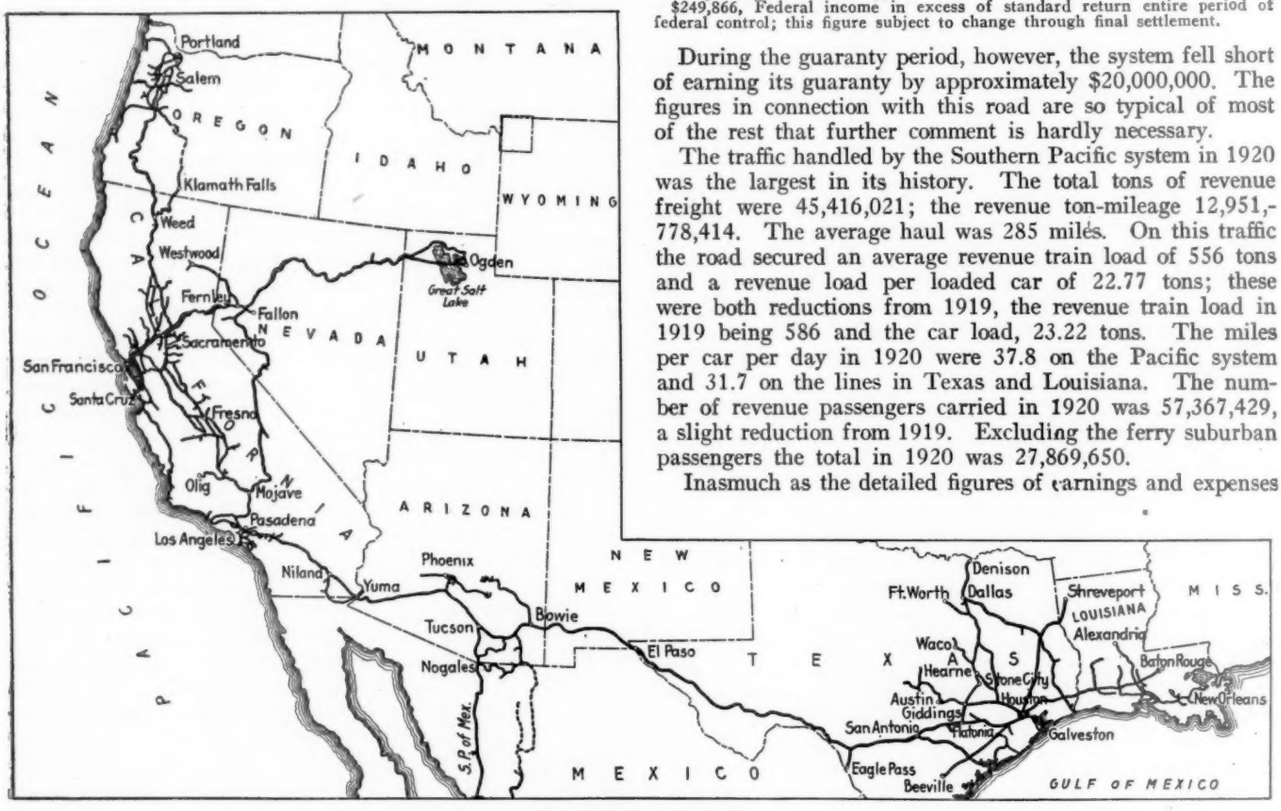
There are extremely heavy grades on some parts of the system; no grades at all on others. In one place snow sheds are a necessity; in another the heat is so intense the year round that the station buildings and other structures require an additional roof for purposes of insulation. The system traverses at some places areas where there is practically no population; on the other hand, it operates out of San Francisco and Oakland, Calif., a ferry and multiple-unit electric suburban service which ranks with the busiest in the country. The system operates steamship lines, ordinary ferry boats and car ferries. Besides its through railway service, it operates out of Oakland, Calif., and Portland, Ore., extensive multiple-unit electric suburban services; it also has some street railway lines.

These various factors have more value than in that they are interesting. Not only do they indicate how extensive and varied are the operations of the Southern Pacific system, but they also give an idea as to the multitude of problems which have been offered for solution and an idea as to the manner in which the solution was brought about. Considering the conditions mentioned and bearing in mind the character of the territory served by its lines, it is natural that the Southern Pacific should have been characterized by continual growth and expansion. In the areas adjacent to Portland, Ore., San Francisco and Los Angeles, Calif., as likewise Houston and Galveston, Tex., and New Orleans, La., the company is serving regions of progress and prosperity. Because of its position and its extensive mileage of branch lines in these centers the traffic and traffic density of the company have increased in marked manner in recent years.

The Southern Pacific is still one of the carriers that is

deriving advantage from the law of increasing return. There is no indication that this expansion will not continue. Every portion of the country served by the lines of the Southern Pacific still has its future before it. This is evidenced in a number of ways, such as: (*a*) our increased ocean-going business across the Pacific; (*b*) the continued expansion of the deciduous fruit industry as assisted by the continuing progress in irrigation, of which the Imperial Valley project is an outstanding example; (*c*) the introduction and expansion of the growing of long staple cotton in the irrigated districts of Arizona and New Mexico, (*d*) the gradual expansion of manufacturing on the Pacific coast, of which the extensive plant of the Goodyear Company at Los Angeles is a leading project.

There is also the expectation that eventually trade relations may again be restored with Mexico. This will, naturally, help the trade centers along the Mexican border, especially El Paso and likely Houston, and the carriers which serve them. As far as the eastern lines of the Southern Pacific are concerned, mention should also be made of the continued progress agriculturally of eastern Texas and Louisiana. Extensive fertile areas are gradually being added in this region by drainage and other methods.



The Southern Pacific

The Southern Pacific's traffic is as diversified as its operations are what we have termed versatile. In 1920, products of agriculture constituted 17.23 per cent of the total tonnage carried on the rail lines of the entire Southern Pacific system, exclusive of the lines in Mexico; products of animals furnished 2.49 per cent; products of mines, 31.35 per cent; products of forests, 20.31 per cent, and manufactures and miscellaneous 28.62 per cent. The tonnage of bituminous coal carried in 1920 was but 3.03 per cent, the reason for this small amount, being, of course, that the fuel used in Southern Pacific territory is oil.

The Southern Pacific, despite the great expansion in business which has taken place in the territory served by it in the past few years, did not prove much of a money maker for the government during the federal control and guaranty periods. Its greatly increased gross revenues were not sufficient to enable it to overcome the expanded costs of operation resulting from control by the government and further costs added by national agreements and higher wage scales. The standard return for the Southern Pacific properties, including both the Pacific system and the lines in Texas and Louisiana, was $48,244,660. For the 26 months of federal control the system's net railway operating income exceeded the total standard return by the sum of $249,866, the figures by years being as follows:

Year	Federal income in excess of standard return	Standard return in excess of federal income
1918	$7,757,935	
1919	.....	$4,334,355
January and February, 1920	.....	3,173,714

$249,866, Federal income in excess of standard return entire period of federal control; this figure subject to change through final settlement.

During the guaranty period, however, the system fell short of earning its guaranty by approximately $20,000,000. The figures in connection with this road are so typical of most of the rest that further comment is hardly necessary.

The traffic handled by the Southern Pacific system in 1920 was the largest in its history. The total tons of revenue freight were 45,416,021; the revenue ton-mileage 12,951,778,414. The average haul was 285 miles. On this traffic the road secured an average revenue train load of 556 tons and a revenue load per loaded car of 22.77 tons; these were both reductions from 1919, the revenue train load in 1919 being 586 and the car load, 23.22 tons. The miles per car per day in 1920 were 37.8 on the Pacific system and 31.7 on the lines in Texas and Louisiana. The number of revenue passengers carried in 1920 was 57,367,429, a slight reduction from 1919. Excluding the ferry suburban passengers the total in 1920 was 27,869,650.

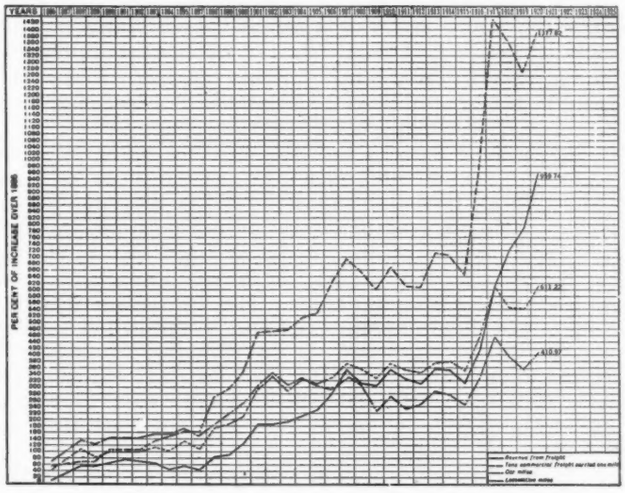
Inasmuch as the detailed figures of earnings and expenses for 1920 and 1919 are given below and more particularly inasmuch as they follow what we have come to consider the usual trend, reference to them may be omitted. Attention should be drawn to the fact, however, that the Southern Pacific will this year be required to spend an unusual amount for maintenance of equipment. At the return of the railroads to private control on March 1, 1920, no less than 87.5 per cent of the company's box cars were away from home.

These cars have been returned to the Southern Pacific lines in bad condition, a typical factor which has already received considerable attention in these columns. On June 1, 1921, the company had 80 per cent of its cars on home lines, of which 16 per cent were in bad order. When the road went under federal control at the end of 1917, the percentage of bad order cars was 4.6 per cent.

It would take considerable space to detail the various projects looking to the improvement of the Southern Pacific's properties which were under way during 1920. They included additions to the shops at Sacramento, Calif.; im-

provements at various engine terminals, notably the installation of 100-ft. turntables at various points; increased capacity at various water stations; new docks and wharves at Oakland, Calif., Wheeler, Ore., Algiers, La., etc.; replacing and strengthening of a considerable number of bridges, trestles and culverts; tunnel improvements at Tillamook Branch, Ore., Tunnel, Calif., Cisco to Lakeview, Calif.; Bakersfield, Calif., to Mojave, etc., and various other work of a miscellaneous character.

During the year there were put in track 524 track miles of 90-lb. rail. The total mileage of main line trackage (as distinguished from branches) of the Southern Pacific on December 31, 1920, was 6,472; of this total 4,343 was laid with 90-lb. rail. Of the total track mileage of 11,610,



Freight Service and Traffic on the Southern Pacific, Showing Per Cent of Increase Over 1885

(including branches) 4,786 had 90-lb. rail. Of the total of main line trackage of 6,472 a total of 3,885 or 62 per cent was automatic block signaled.

During the year the company placed large orders for new cars and locomotives both with its own shops and outside builders. These orders included 10 Mikado, 21 Pacific, 24 six-wheel switching, 15, 2-10-2 type and 2 electric locomotives.

A description of the Pacific and 2-10-2 type locomotives, with some details as to the service for which they are intended, was given in last week's issue of the *Railway Age*.

Freight car orders included 2,500 box, 500 automobile, 1,000 stock, 1,000 flat, 250 ballast and 65 caboose cars. Orders were also placed for a total of 100 passenger train cars. Reference should also be made to the 4,000 refrigerator cars received during 1920 by the Pacific Fruit Express, in which company the Southern Pacific has a half interest. It is rather evident that the Southern Pacific should be in a good position from the standpoint of equipment when deliveries on these several orders have taken place.

A noteworthy feature in connection with this equipment is that the system applied for a loan from the revolving fund to assist in financing its purchase. This application covering an amount of $7,500,000 was denied by the Interstate Commerce Commission on the ground that the showing made in respect to the inability of the company to secure the funds from other sources was unconvincing. Whether that was the intention or not, the commission's decision may properly be regarded as a bit of a tribute to the system's financial standing.

The operating results in 1920 as compared with 1919 are as follows:

	1920	1919
Mileage operated	11,152	11,043
Freight revenue	$183,416,523	$163,011,660
Passenger revenue	71,701,637	59,371,140
Total operating revenue	282,269,504	239,657,272
Maintenance of way expenses	48,465,465	34,894,157
Maintenance of equipment	59,548,392	48,011,453
Traffic	3,490,707	2,256,661
Transportation	117,227,798	93,280,331
General	8,112,652	6,101,740
Total operating expenses	242,113,790	188,385,172
Net revenue from operation	40,155,714	51,272,100
Taxes	14,792,064	11,911,995
Railway operating income	25,250,705	39,308,410
Net railway operating income	21,312,344	39,677,068

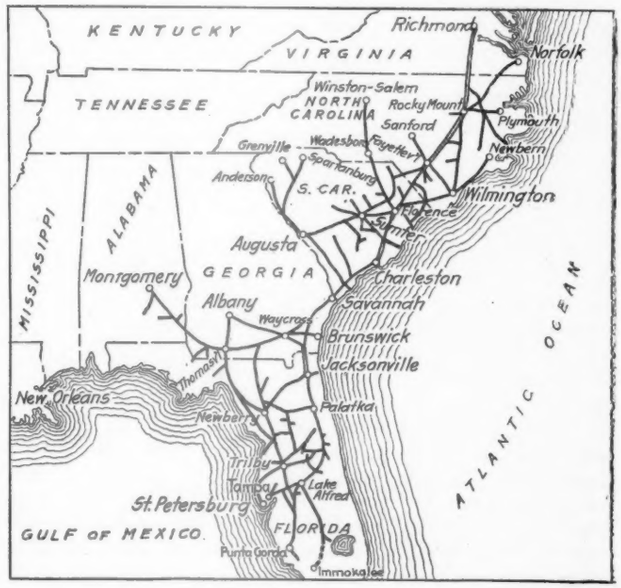
The corporate income account is as follows:

	1920	1919
Total operating income	$17,718,104	$2,352,809
Income from lease of road—standard return (January and February, 1920)	8,043,288	48,244,660
U. S. Government guaranty (March 1 to August 31)	20,490,428	.....
Total non-operating income	39,892,612	55,105,210
Gross income	57,610,716	57,458,020
Total deductions from gross income	25,540,441	25,909,413
Net income	32,070,275	31,548,607
*Dividend appropriations of income	.....	17,478,459
Income balance to credit of profit and loss	31,016,329	13,047,284

*The dividends paid during 1920, amounting to $18,209,597, were appropriated from the profit and loss surplus, and therefore do not appear in the income account.

Atlantic Coast Line

THE DISTINGUISHING FEATURE of the operations of the Atlantic Coast Line is probably indicated in no better way than by reference to the fact that of the 22,000 odd box cars owned by that road, no less than about 95 per cent are felt-lined ventilator cars. These cars are, of course, used for other purposes than for carrying commodities which require ventilator cars, but so important is the perishable freight traffic that cars for it must be available on short



The Atlantic Coast Line

notice and in sufficient quantity. The Atlantic Coast Line is one of the largest, if not the largest, originators of perishable freight in the country. Its tonnage of fruits and vegetables in 1920 constituted but 5.66 per cent of the total tonnage; the revenue from perishable freight, however, made up 19 per cent of the total freight revenues, being exceeded only by products of forests which made up 20 per cent of the revenues. The Atlantic Coast Line originates no coal—bituminous coal in 1920 made up less than 7 per cent of the total revenue tonnage.

The Atlantic Coast Line is the most easterly of the important north to south lines in the southeast. It serves the

coastal plain which extends along the Atlantic seaboard and which includes Florida and the eastern portions of Georgia, the Carolinas and Virginia. This extended area is characterized by having some of the most fertile soil in the world. Its place in the agricultural development of the country bids fair to become of greater and greater importance as its potentialities are better realized and as the various existing low areas are gradually drained and brought into use. Because of the character of the region which the Atlantic Coast Line serves and more particularly because of the fact that it lies in a north and south direction, the road's traffic in perishables extends with fair regularity throughout the year. From November to May it handles the peak of the Florida traffic, notably in citrous fruits, celery, lettuce, tomatoes, etc. As the season advances, the road begins to receive traffic from the regions further north, the various vegetables being brought into the market in such a way as to fill out the year round.

This perishable traffic is difficult to handle; it requires fast schedules which must be adhered to so as to prevent undue damage claims. The problem of car supply is of special importance and the predominance of ventilator equipment shows how the road has succeeded in meeting it. Much of the traffic moves in refrigerator cars and there is a growing tendency in that direction. Some 60 per cent of the traffic in perishables moves to points in and east of the Buffalo-Pittsburgh zone; the remainder going to the west and southeast. It should not be understood that fruit and vegetables constitute all of the agricultural products carried. Cotton supplies a considerable tonnage. North Carolina in 1920 for the first time exceeded Kentucky from the standpoint of value of its tobacco sales; a large portion of this tobacco moves over the Coast Line.

The Atlantic Coast Line's standard return for the period of federal control was $10,180,915. In 1918 it was one of the few carriers which earned more than its standard return, its net railway operating income for that year being $11,626,128. In 1919 its net railway operating income was $7,144,330; in 1920, $3,908,649. So far this year, the road has not been doing as well as in the same period of last year. The net railway operating income for the first four months of 1921 was $2,821,048; in the first four months of 1920 it was $3,592,540.

In 1920 the road carried 17,324,916 tons of freight for a total of 3,290,282,723 ton-miles, increases of 8.62 and 4.86 per cent respectively, over the 1919 figures. The total freight revenues in 1920 were $48,193,387 as compared with $40,842,275 in 1919, an increase of 18 per cent. Total operating revenues were $74,121,956, an increase of 16.62 per cent over 1919. As against this increase of 16.62 per cent in operating revenues, there was an increase of 28.87 per cent in operating expenses; or, in other words, the Atlantic Coast Line is another road typical of all the rest that have found too great the burden of high wage scales and the handicaps in general corollary to the aftermath of federal control. The Atlantic Coast Line's report gives in rather better detail than the reports of most roads the information which the student needs to analyze the year's results. The following figures, introduced to show the reason for the decreased net even with increased freight rates, will be of interest:

In 1916 the company had a total operating payroll of 19,170 employees, it moved 2,514,243,295 tons of freight one mile and had a total operating payroll cost of $13,381,874.

In 1920 it moved 3,290,282,723 tons of freight one mile, it had a total operating payroll cost of $40,199,926, and in August of that year had 25,215 employees.

From December, 1916, to December, 1920, freight rates were advanced approximately 60 per cent.

The above figures reduced to per cents show:

An increase in the number of employees of....	31.5 per cent
An increase in the number of tons one mile of	30.9 per cent
An increase in the operating payroll cost of..	200.4 per cent
An increase in freight rates of.....	60.0 per cent

From December, 1920, to February, 1921, or in two months, the tons moved one mile show a decrease of 10 per cent (based on daily movement), or at the rate of 60 per cent per annum, bringing the amount of freight moved below the normal amount due to move, had pre-war conditions not been interrupted by the world war. It is hoped that by agreements to be negotiated direct with your company's employees and by reductions in wages in conformity with the decrease in the cost of living, reasonable reductions in payrolls will be effected without any measure of injustice or unfairness to your employees. Your officers are making every effort to secure proper economies in expenditures for fuel, crossties and other materials, and in this connection there will be noted a decrease in the number of employees from 25,215 in August, 1920, to 21,980 in March, 1921.

The Atlantic Coast Line is one of the more prosperous and strongly financed American railroads. Its growth to its present size and importance, particularly because of the manner in which it was brought about, forms one of the most interesting developments of American railroad history. This story has been put in book form, a book entitled "A History of the Atlantic Coast Line Railroad," written by Howard Douglas Dozier, Professor of Economics at Dartmouth College, having been published a few months ago.

The Atlantic Coast Line itself operates 4,890 miles of railroad. It is nucleus, however, of a system of no less than 13,334 miles. It owns a majority stock interest in the Louisville & Nashville, operating 5,044 miles, which in turn controls the Nashville, Chattanooga & St. Louis, 993 miles, and has, jointly with the Southern, a majority stock interest in the Chicago, Indianapolis & Louisville, 658 miles. The Atlantic Coast Line and the Louisville & Nashville together lease the Georgia Railroad, and other carriers in which the Coast Line has an appreciable interest include the Charleston & Western Carolina, the Atlanta & West Point, the Winston-Salem Southbound, etc. The general balance sheet of the company as of December 31, 1920, shows investments in affiliated companies amounting to $68,085,882 and other investments of $3,110,181. Of the gross corporate income of $15,252,783, non-operating income, including dividends amounting to $2,890,383, interest on investments, etc., was $4,633,544. The net corporate income in 1920 was $7,890,562 as compared with $7,187,537 in 1919. Dividends on the common stock amounting to 7 per cent were paid in both years.

During 1920 the Atlantic Coast Line ordered and received five switching and 25 Pacific locomotives and also ten of the Russian Decapod locomotives. It received also 100 phosphate cars ordered in 1919 and had on order on December 31, 500 box and 400 coal cars. This new equipment has been financed without assistance from the revolving fund administered by the Interstate Commerce Commission.

The operating results for 1920 as compared with 1919 are as follows:

	1920	1919
Mileage operated	4,890	4,868
Freight revenue	$48,193,387	$40,842,112
Passenger revenue	19,138,399	18,448,229
Total operating revenue	74,121,956	63,559,015
Maintenance of way expenses	12,306,513	9,488,092
Maintenance of equipment	17,025,590	13,851,670
Traffic expenses	1,018,168	775,813
Transportation expenses	36,366,143	27,702,731
General expenses	1,763,373	1,334,789
Total operating expenses	68,943,732	53,499,911
Taxes	3,225,000	2,510,000
Operating income	1,953,224	7,549,104

The corporate income account is as follows:

Standard return (January and February, 1920): year 1919	$1,684,187	$10,180,915
Additional compensation, January and February, 1920	5,317	.....
Railway operating income, March 1 to Aug. 31	5,478,458	.....
Operating income, Sept. 1 to Dec. 31	2,886,334	.....
Dividend income	2,890,384	2,689,619
Gross income, inc. other	15,252,783	14,116,304
Deductions from gross income:		
Interest on funded debt	6,028,525	6,042,301
Total deductions including other	7,362,221	6,827,605
Net income for year	7,890,562	7,288,699
Dividends:		
Preferred, 6 per cent	9,835	9,835
Common, 7 per cent	4,801,034	4,799,158

Remedies for Wastes in Railway Operation

More Thorough and Intelligent Cost Keeping Methods Necessary —Where Are the Greatest Leaks?

By F. J. Lisman
F. J. Lisman & Co., New York

THE TRANSPORTATION ACT of 1920, Section 222, provides that the Interstate Commerce Commission shall establish rates so that carriers as a whole in each rate group will "under honest, efficient and economical management and reasonable expenditures for maintenance of way, structures and equipment, earn an aggregate annual net operating income equal as nearly as may be to a fair return upon the aggregate value of the property of such carriers held for and used in the service of transportation." Section 223 provides "that during the two years, beginning March 21, 1920, the commission shall take as such fair return a sum equal to 5½ per cent of such aggregate value."

Sooner or later the commission must take up the question of exactly what constitutes "honest, efficient and economical management," etc., and this question is brought to the forefront in the New England rate case, because some of the lines concerned charge each other with inefficiency. Before exact justice, therefore, can be done in this New England division case, the question of economical management will have to be adjudicated. The Interstate Commerce Commission has had a number of knotty problems put before it but none more difficult than this particular one.

The commission can, of course, send its own experts or recognized railroad experts to investigate these properties, but no matter whom they may employ the findings will, as usual, be disputed not only by the particular management which may happen to be criticized, but also probably by other experts considered equally competent.

I have suggested as a temporary solution* of the New England problem that the earnings on business interchanged between other roads in trunk line territory and the New England railroads, for the time being, be divided so that the New England railroads as a whole will earn on their fair value, a sum approximately equal to that earned by the trunk line group as a whole. This method of settling the New England rate case, however, is akin to communism, because if all the properties were operated in common such an arrangement would take away the incentive for each road to cut down its operating expenses to a minimum.

The only method of arriving at an adjudication of any subject is to have the parties in interest get together as closely as possible and then clearly define the points on which they cannot agree. I have, therefore, suggested that the Interstate Commerce Commission suggest or recommend to the carriers that they keep separate accounts not only of earnings accruing from the business interchanged with New England lines, but also as nearly as possible of the expenses incurred in connection with said traffic; that the carriers west of the Hudson river file with the New England carriers, and the New England carriers file with their western connections, not more than 90 days after the close of each month, a detailed report of the earnings and expenses incurred in connection with this interchange traffic. If any carrier should feel that these accounts are not properly kept they shall endeavor to arrive with each other upon an understanding as to the proper method of keeping such accounts, and if they fail to come to an agreement within 45 days after the question of improper accounting has been raised, they shall appeal to the commission with a request for a decision on the subject.

For instance, if the Erie Railroad should assert that the New Haven system is charging an undue proportion of its terminal and yard expenses to through traffic, or that it is not operating its terminals economically, and is prepared to point out how money can be saved, then it would be up to the officials of the two lines to thrash out the matter and if they cannot agree as to what is fair, the subject should be referred to the commission for adjudication.

Cost of Handling Any Given Commodity

The New England rate case which pushes this cost problem to the front, also presents in a more aggravated way the problem of what expenses can be reduced. Railroad officials have generally asserted that exact cost accounting in railroad operation is impossible; that they cannot state how much it will cost to haul a carload of silk as against a carload of coal, etc. This to an analytical mind seems like begging the question. The exact cost of hauling a carload of silk as against a carload of coal can be exactly defined, because the cost of hauling one ton per mile over any particular division is known. If a carload of silk contains 15 tons of paying freight and the car weighs 20 tons, then the cost of hauling these 35 tons of weight is in the same proportion as the cost of hauling a coal car weighing 20 tons and carrying 50 tons of coal. To be precise, the gross weight of the carload of silk would be 35 tons and the carload of coal 70 tons. If the locomotive is capable of hauling 3,500 gross tons over any given division, then the cost of hauling this carload of silk would be 1 per cent of the total operating cost of that train, while the cost of hauling the carload of coal would be 2 per cent. In order to further adjust the cost of handling these commodities, the empty car movement in the reverse direction must be taken into consideration and if this particular road should move 80 per cent of its coal cars light in the opposite direction and only 30 per cent of its box cars, then the cost of the empty return movement must be added to the cost of the loaded movement.

The actual cost of hauling freight over the road, or what might be called the "rolling charge" forms, however, only about 15 per cent to 18 per cent of the total operating expenses, or about half of the cost of conducting transportation. This particular and important part of conducting transportation is probably the easiest to define.

Maintenance of Way

The Interstate Commerce Commission has finally decided on how the companies are to distribute the relative cost of passenger and freight business. It has always been said this could not be done and quite possibly the theory on which rules prescribing how this should be done may not be exactly correct; however, the rules are in force and should remain so until somebody can definitely prove that they are wrong in some particular respect, when undoubtedly they should, and can be changed.

When it comes to a question of how much it costs for maintenance of way to haul a carload of silk or a carload of coal, then undoubtedly experts will agree that the upkeep of roadway, while it may be partially influenced by weather,

*See *Railway Age*, April 29, 1921, page 1028.

is really based on the amount of tonnage hauled over the track and on the speed with which it is hauled. If a company happens to have a traffic density of 1,000,000 net tons, which is probably not far from 2,000,000 gross tons per mile per annum, then the expense of maintenance appertaining to freight business can be divided on a gross tonnage basis, with a proper adjustment for fast freight as against drag or local freight trains.

Engineers have figured out, more or less, the hammer blow of a locomotive moving at 40 miles per hour as against one moving at 20 miles per hour. Fast freights should be debited with a somewhat heavier proportion of the cost of maintaining the track than the slower trains. Experienced engineers may not have been able to agree entirely on just what would be a fair arbitrary, but the opinion they would give would probably coincide fairly closely and an average of these opinions would not be far from correct. One 150-ton locomotive may, on account of more scientific construction, have a lighter hammer blow on the rail than another locomotive of the same weight, and a heavily loaded coal car may be harder on the track than a locomotive of the same weight.

Maintenance of buildings, such as freight stations, should not be charged for on a tonnage basis, but on a basis of usage to the different commodities. For example, mineral traffic does not pass through the freight houses and the only reason why it should be debited with a part of freight house expenses would be on account of the office force handling the clerical part of the work in these buildings.

Maintenance of Equipment

Maintenance of equipment might probably be accounted for entirely on a basis of gross tonnage because it costs as much for repairs per locomotive for 1,000 ton-miles whether the locomotive is hauling empty cars or paying freight. The proper method of charging up the maintenance of freight cars is open to considerable discussion. Naturally the cost of maintaining flat, gondola, box, tank or stock cars, etc., should be charged up to the respective classes of commodities carried in same. Furthermore, certain commodities are harder on the equipment than others: for instance, lime carried in bulk, chemicals, etc. Naturally, such special appliances as grain-doors must be charged to the grain traffic.

Maintenance of equipment officials might agree that the cost of maintaining any given type of cars should be loaded by certain percentage according to the commodity carried.

The cost of maintaining shops, machinery, etc., should be based on the same theory as that of maintaining locomotives and cars, while the cost of maintenance of engine terminals should probably be charged on a straight mileage basis.

General Expenses and Traffic Expenses

General expenses and traffic expenses should also be based on the amount of work done by the railroads; that is, on the gross tonnage handled. Railroad men and others talk of railroads handling net tons when they are all the while handling gross tons. Advertising, salaries of traffic men, cost of traffic associations, etc., are incurred for the purpose of handling net tons, but in order to get net tons, it is first necessary to produce gross tons, just the same as it is necessary for a mining company to extract large quantities or many tons of ore in order to get a comparatively small amount of metal. A mining company generally bases all its overhead and most other expenses on the tonnage of ore produced. Substantially the same remarks apply to all general expenses.

Conducting Transportation

Coming back to the cost of transportation, the cost of superintendence is largely based on the amount of paying business handled and should be based on the gross tonnage. The cost of dispatching trains is based on the cost of cars handled and should likewise be based on the amount of gross tonnage handled. The same remarks apply to weighing, inspection and demurrage. The cost of coal and ore wharfs should naturally be charged up to the commodities passing over these wharfs.

The cost of loss and damage should in all cases be ascertained and be debited to each particular commodity as nearly as possible.

The cost of injuries to persons, damage to property, clearing wrecks, etc., is so difficult to allocate, that undoubtedly the fairest way is to base it all on gross tonnage.

Yard and Station Service

The allocation of the cost of yard and station service has been the item which has shown the greatest increase in the last eight years and is more difficult to define than any other. I have searched diligently for information on this subject, but have generally met with the response that these expenses cannot be allocated. Where there is a will there is a way, and by analytical thinking some way must be found to analyze these costs, not only for the purpose of knowing whether the business is handled economically but also whether certain traffic is worth having.

Yard switching is for the purpose of making and breaking up of trains, and should be clearly allocated on the same basis as that of the rolling charge; that is, on a gross ton basis. Yard service, if performed for the purpose of switching cars to and from freight houses, to and from team tracks or to and from industrial tracks, is in a different position. Nearly every engine in the course of each day performs all three of these latter services, and the time spent in each kind of service is probably not alike in any two given cases. It depends on the promptness of clearances which the engine with a cut of cars may get over busy tracks; on the number of switches which have to be thrown; distance traveled and also, to a considerable extent, on the diligence and intelligence of the crew in trying to do its work promptly. Nevertheless, it is up to the yard officials to keep track of the number of cars handled by each switching engine in each service, and to consider the cost of the various movements with a view to working out a standard of cost, etc.

Freight House Expenses

It probably costs a trifle more to handle outbound freight than inbound freight. While the expenses per ton handled through modern freight houses do not differ greatly, those familiar with this particular kind of work say it is utterly impossible to state whether it costs more to handle a piece of machinery weighing 1,000 lb. as against 20 boxes of groceries weighing 50 lb. each. Study can, and should be made of this subject, and expenses in station buildings in many cases can be greatly reduced by more efficient handling and by piece-work. It has been found that when gangs have been handling goods moving through freight houses on a piece-work basis, they do the work much quicker and at a substantially lower cost than employees who are paid by the hour. Close comparison of such costs as between companies would undoubtedly lead to considerable saving.

It is precisely the costs of freight houses and yard expenses which will finally have to be thrashed out in the New England rate division case. Possibly the trunk lines are right when they claim that the yard and freight house expenses of the New England roads are unduly heavy, but it is up to them to prove this assertion, and if they can do it, a great leap ahead in railroad cost accounting will be accomplished.

These statistics will also demonstrate, more or less, what kind of traffic is paying and what kind of traffic is handled at a loss.

Losses in Railway Operation and Their Remedies

This leads to the important question: Where are the greatest leaks or losses in the railroad business? I believe

that on the "less than carload business" the railroads are losing not less than $50,000,000 a year.

It is impossible to get at the gross earnings from l.c.l. business, but they are probably about 8 per cent of the total freight earnings, or about $350,000,000 per annum against which must be debited the bulk of the loss and damage expense, which has been steadily creeping up and now averages over 2 per cent of the freight earnings. If these costs of loss and damage were properly allocated to the l.c.l. traffic, it would probably consume from 15 per cent to 20 per cent of the gross earnings from this source.

The bulk of the freight house expenses and the large investments for terminals are made in connection with and for the purpose of handling l.c.l. traffic, and further investment for this particular purpose is called for from time to time. The loading of merchandise cars averages about 16,000 lb. and, therefore, the proportion of paying freight carried in these cars is only approximately 30 per cent of the gross weight hauled by the locomotive.

A close cost study of l.c.l. traffic will disclose that most railroad companies, many of which are now bitterly complaining about automobile truck competition, had better let the trucks have this business. This applies especially to the short haul less than carload business originating or terminating in the larger cities, where there are long delays in connection with switching to and from freight houses through large yards, and where the capital investment is very great.

Another way of saving on this business, besides the obvious attempts in reduction of loss and damage, consists of what was known during the war as "sailing days." Many companies should decline to handle the usual daily number of package cars and let competing railroads get the business or force concentration into much greater loads and do the loading more carefully.

Raise the Minimum of Loading

The second greatest source of waste, running into many millions, is light loading. While the capacity of freight cars in the last 20 years has increased by fully 50 per cent, the minimum carloads of the various commodities have probably not increased more than about 20 per cent. Many state commissions have prescribed a low minimum carload on many commodities in order to help the small producers or dealers. This is short-sighted local regulation at the expense of the nation at large. There have been long investigations of this subject and barrels of ink have been spilled over it, but very little has been accomplished in the interest of economy. A small committee should be appointed composed of representatives of the different groups of railroads throughout the country which should make definite proposals to raise the minimum weight of carload freight to a reasonable and economical level.

There is no reason why a small shipper should be allowed to load a car at less than its reasonable capacity just for the purpose of helping him, and let the public at large in effect pay him a bonus. The most economical and intelligent ruling for a minimum carload is the tonnage capacity, or cubic capacity of the car. If a shipper prefers a 40-ton car when only a 50-ton car might be available in his vicinity, then he should, in the interest of national efficiency, be compelled to take whatever car may be at hand.

Assuming that mineral traffic, which amounts to roughly 50 per cent of the tonnage, is now all handled in full carloads, then the raising of the minimum weight per carload by 10 per cent on other commodities would not only be equivalent to the construction of 125,000 additional freight cars which, at present prices of about $1,800 per car, would represent an investment of $225,000,000, but it will mean a reduction of substantially 5 per cent in operating expenses all-around, because it will cause a reduction of 5 per cent in freight train miles on the main lines; also in switching miles, cost of repairs and, theoretically, a similar decrease in maintenance of way and in the bookkeeping; that is, general expenses connected with the handling of traffic, etc.

Wasteful Accounting Methods

The additional expense of accounting put upon the railroads by the Interstate Commerce Commission in asking for all kinds of statistics, is surely not less than $25,000,000 and probably exceeds $50,000,000. There is no reason why the Interstate Commerce Commission should not have all the information which is of service to it, but methods could be found to consolidate these various reports and abolish a great many. If, for instance, someone in a certain section of Texas complains to the commission that he is not getting as many livestock cars as another section of the same state, or of Oklahoma, the railroad companies will be required to regularly file a report as to the number of livestock cars dispatched in each particular section and these reports are required to be filed continuously and long after the necessity or use for them has ceased.

I recently congratulated a president of a railroad on the fact that he had just crossed the $1,000,000 mark in gross earnings, and that, therefore, his road has become a Class 1 carrier. He replied that this was a subject for condolence rather than congratulations, because it would require much additional accounting on the part of his organization. He figured this additional cost would run anywhere from $10,000 to $25,000 and that the additional net which he might derive from the first $100,000 gross earnings above $1,000,000 would all go for additional cost of accounting as required by the commission. Surely this is absurd!

I would suggest that a conference be called between the railroad accountants and the statisticians of the Interstate Commerce Commission with a view to reducing the number of reports required to a minimum, and to consolidate them as much as possible.

There are, of course, many other savings possible in various ways by the various companies. Unquestionably, all railroad shops are not run efficiently, no more than all private machine or government shops. Right here, one difficulty arises. While railroad officials have not been compelled during the last three and a half years to spend as much time with the various state commissions as they formerly did, far too much time is being given by them to the various governmental requirements and to discussing matters of accounting, physical valuation, etc., with the numerous kinds of government officials. Railway officials cannot give the required time to thoroughly supervise their own affairs because they are too much involved in problems which too much regulation has thrust upon them.

Increased Percentage of Paying Load Most Important

Some one has well said that the objects of a railroad are:

(1) To transport as large an amount of freight and passengers as possible;
(2) To handle this traffic with the smallest number of train-miles;
(3) To operate each train-mile at the lowest possible cost.

The public at large certainly would be startled if it could be made to visualize the fact that the actual cost of transportation of trains over the road constitutes less than one-fifth of the total costs connected with the operation of railroads, and it is equally difficult for the public to visualize the fact that the expenditure of most of the remaining four-fifths is absolutely essential. All railroad statistics as shown to the public and stockholders, and for that matter most of those as shown to the operating officials themselves, are based on net tons. Managers of sugar mills base their reports on the number of tons of cane or beets which are ground and

they take much pride when they can show in any one year that the amount of sugar extracted by them is a fraction of one per cent greater than it was during the year before.

Similarly, the attention of everyone interested in railroads must be concentrated on extracting a greater amount of paying ton-miles in proportion to gross tons handled. If everybody will concentrate and the operating officials of the various lines will emulate each other towards producing less gross and more net tons the possible achievements in this direction would probably be quite surprising.

Labor Costs

All the above savings are trifling compared with possible savings connected with the cost of labor.

Out of every dollar earned by the railroad companies

In 1912, 43.1 per cent went for wages
In 1916, 40.8 per cent went for wages
In 1920, 59.9 per cent went for wages

Similarly, out of each dollar of railroad gross earnings, net earnings applicable to interest on capital were—

In 1912, 25.2 per cent
In 1916, 29.10 per cent
In 1920, 1.00 per cent

The amount of public service rendered for each dollar of interest and dividends paid to owners of railroad securities was—

In 1913, 459 ton-miles and 47 passenger miles
In 1917, 582 ton-miles and 53 passenger-miles
In 1920, 611 ton-miles and 64 passenger-miles

In other words, in spite of the decreased value of the dollar, capital during this eight-year period rendered an increased service of about 33 per cent for each dollar paid to capital. Inasmuch as the additional capital invested in railroads during this period has received no income, or has transplaced other capital which had to do without income, the result achieved by capital in the way of public service is shown in another way; that is to say, the increased service per dollar of capital invested in railroads during the same eight-year period was about 12 per cent. On the other hand, for each dollar of wages paid out, the railroads rendered—

In 1913, 245 miles of freight service
25 miles of passenger service
In 1920, 121 miles of freight service
13 miles of passenger service

or just a trifle less than half.

One might write volumes, but they could not more strongly prove the fact that the present high cost of transportation and lack of return on railroad capital has been due to abnormally high wages and inefficiency of labor. If railroad rates are to be reduced and the railroads are to be really managed in the most economical and efficient way, the only way is to repeal all special pro-labor legislation and let the railroads deal direct with their employees, practically in the manner in which the Pennsylvania Railroad is now proposing to handle its business.

We had very few railroad strikes before the war and the enactment of the Adamson bill, and we probably would have less strikes in the future because railroad officials would have to conform to public opinion on the subject of wages: public opinion is much more wide-awake on this subject than it used to be.

Permanent Remedy for Labor Trouble

Congress could in the interest of the public, in the interest of capital invested in the railroads, and in the interest of the bulk of labor, pass constructive legislation which will forever settle the wage question in a peaceful manner. The remedy for the present situation is as follows:

The provisions concerning the Labor Board in the Esch-Cummins bill should be repealed and in lieu thereof, there should be authorized a Labor Bureau under the supervision of the Interstate Commerce Commission. Labor employed by railroad and utility companies is just as much charged with the public interest as the management and, therefore, its joint activities should be under the same authority as the management. The function of the Interstate Commerce Commission Labor Bureau should be as follows:

1. To lay down rules for the election of the labor union officials, which shall be by secret ballot, and to supervise such elections.

2. If there appears to be any dissatisfaction or disagreement between a railroad corporation and its employees, the points of difference shall be submitted to the Labor Bureau, which shall clearly define them. In case 5 per cent of the employees or members of any union shall sign a petition favoring a strike, then the Labor Bureau shall order a secret strike vote which shall be supervised by it.

3. To prescribe a form of accounting, in accordance with which, all books of such labor unions are to be kept.

4. The accounts of the labor unions shall be audited by a certified accountant employed by the bureau; said reports to be printed and open to inspection by the public.

Everyone knows that strikes are generally declared by a small minority of more or less irresponsible and restless young men who want excitement, while the majority of the loyal, steady employees are passive in these matters and merely go on strike because they fear that they or their families will be molested. The union leaders will vociferously object to such legislation, but I am convinced that if this proposed legislation were to be voted on, not only most working people but also a majority of union labor would favor it by a large majority.

Competition

Just as it was the fashion a generation ago to encourage competition, and just as it was the fashion up to recently to regulate everything, the present slogan seems to be to avoid the alleged waste incidental to competition. Before Congress and the country go too far in this, a very close study should be made of the amount of operating expenses actually due to competition. While some railroad mileage might be abandoned here and there if competition were eliminated, this probably would not amount to very much—certainly not more than 5,000 miles, or 2 per cent of the entire mileage, and probably not half that.

While freight stations in many communities might be consolidated, the total savings in the expenses of maintenance of way would certainly be less than 2 per cent. There would be no savings in the maintenance of equipment at all, except, possibly, by the consolidation of shops here and there, but as all the good railroad shops are now generally worked to their full capacity, the savings of maintenance of equipment would not be very much.

The traffic department involves an expense of not over 3 per cent of the gross earnings of the railroad. This probably could be largely eliminated, although the shippers will greatly miss the accommodation and information now given out by this department.

Advertising could undoubtedly be reduced considerably, but whether this would be a real saving is another question because advertising of special excursions, reduced round-trip fares, etc., stimulates traffic, and the advertising of train schedules is a great service to the public.

In the conducting transportation department the only possible savings would be by increasing train loads on branch lines, which is equal to saying that people served by branch lines would get poorer service.

Quite true, other savings might be instituted, such as the

slowing down of competition, time freights, etc., all of which would mean reduction of service to the public.

Consolidation of service in the yard and terminals might here and there save considerable money, but these savings would probably be considerably less than 3 per cent of the total amount expended for conducting transportation.

General expenses could, theoretically, probably be reduced by consolidation, but as the size of the companies would be greatly enlarged, the work assigned to clerks would probably be increased so much that the theoretical savings would disappear. While the number of presidents might be decreased, the number of general, or supervising officers could not be decreased at all because as it is, there are not enough of them. Therefore, the amount disbursed for that purpose could not be reduced.

While anyone who has not studied this situation may glibly talk about the waste of competition, upon close examination it will be found that, with the exception of the operation of wasteful competitive passenger service, it does not exist on a great scale. If competitive expenses amount to 3 per cent of the total gross earnings of the railroads, they would run up to the very tidy sum of $180,000,000 a year, or a little over one-half of what the government is now collecting in taxes from passenger and freight service.

Wasteful passenger service could easily be regulated by pooling of the business, and competition in freight service is probably worth to the public all it costs. Stratification of service and bureaucracy is certain to creep into every management which has no competition. The incentive to get ahead of the other fellow by giving better service is probably worth, not only what it actually costs, but several times that.

Before Congress legislates against competition, a close analysis of the cost and value of competition should be made.

Many old problems are dealt with in a new way in this article and many new points are raised on which there will unquestionably be much difference of opinion. As progress can only be achieved through discussion, I hope that your readers will freely and frankly criticise the suggestions which are made.

Grand Central Busiest New York Station

THE GRAND CENTRAL TERMINAL carried off the honors in 1921 for handling the largest number of railroad passengers into and out of New York City with a total of 36,937,129 passengers, according to figures compiled by the New York Transit Commission and made public last week. The Pennsylvania Station was second with a total of 35,947,570 while the Long Island's station at Flatbush Avenue, Brooklyn, was third with 33,968,090. The Long Island, which brings passengers into three stations, including Flatbush Avenue, Pennsylvania Station and Long Island City, handled the largest number of passengers during the year, its total being 59,133,876, while the Pennsylvania was second with 42.260,425 passengers. The Long Island's traffic at Flatbush Avenue represents what may be called the most intensive movement shown in the record, as the whole of the traffic to and from Flatbush Avenue is carried on two tracks. The Flatbush Avenue total for 1920 was almost 6,000,000 (23 per cent) greater than in 1919.

These figures omit from consideration the Hudson & Manhattan, which operates tubes under the river and a line to Newark, N. J. That road handled to and from its Cortlandt street terminal 52,389,914 passengers and a total of 85,685,868 passengers, a large portion of whom used also trains of the Pennsylvania, Baltimore & Ohio or Lehigh Valley (to or from Manhattan Transfer) or of the Erie or Lackawanna.

The figures compiled by the transit commission show the total number of passengers handled in and out of New York City in 1920, including those using the Hudson & Manhattan, as 252,763,523, an increase of seven per cent over 1919.

The details as compiled by the commission are tabulated as follows:

PASSENGER TRAVEL ON ALL STEAM ROADS IN AND OUT OF NEW YORK CITY, 1920

Baltimore & Ohio (Pennsylvania Station)				330,000
Central of New Jersey—				
Commuters			*10,882,157	
All others			7,254,771	
				18,136,928
Delaware, Lackawanna & Western—				
Commuters			13,233,165	
Passengers on 50-trip family tickets			2,073,300	
Other passengers on suburban trains			5,446.575	
Passengers on through trains			800,000	
Total (Hoboken)			21,553,040	
One-half of this number (estimated) used the Hudson Tubes, leaving for ferries				10,776,520
Erie Railroad—				
Commuters			*21,901,892	
All others			5,475,473	
Total (Jersey City)			27,377,365	
Two-thirds of this number, it is estimated, used the Hudson Tubes, the balance using the ferries being				9,125,788
Hudson & Manhattan—				
Sixth Avenue Line			33,295,954	
Terminal, Cortlandt St.			52,389,914	
				85,685,868
Lehigh Valley (Pennsylvania Station)				460,000
Long Island—				
Long Island City Terminal			1,725,706	
Pennsylvania Station			23,440,080	
Flatbush Avenue Terminal, Brooklyn			33,968,090	
				59,133,876
New York Central—				
	Regular	Commutation and school	50-Trip family	
Grand Central, Main Line	4,505,367	5,264,533	669,500	10,439,400
Grand Central, Harlem Div.	1,774,610	6,814,537	1,448,700	10,037,847
Sedgwick Ave., Putnam Div.	254,678	669,268	188,250	1,112,196
42nd St. and Cortlandt St. Ferries (West Shore)	1,306,371	5,368,956	452,500	7,127,827
Total	7,841,026	18,117,294	2,758,950	28,717,270
New York, New Haven & Hartford—				
	Regular	Commutation and school	50-Trip family	
Grand Central	8,295,191	7,279,094	885,597	16,459,882
Harlem River Terminal				492,211
New York, Ontario & Western (by West Shore Ferries)				634,132
		Regular	Commutation	
N. Y., Westchester & Boston		3,698,156	743,856	4,442,012
Pennsylvania—				
Cortlandt Street Ferry				4,617,942
Desbrosses Street Ferry				2,033,604
		Regular	Commutation	
Pennsylvania Terminal		9,373,992	2,343,498	11,717,490
Total, Pennsylvania Railroad				18,369,036
Grand total				252,763,523

*Estimated.

In addition to the traffic shown in the table, the Pennsylvania also received from and delivered to the Hudson & Manhattan at Manhattan Transfer 23,891,389 passengers (commuters 15,529,403; all others, 8,361,986), making the grand total of all Pennsylvania Railroad passengers arriving at and leaving New York City during the year 42,260,425. This company also carried to and from its Jersey City Terminal (Jersey City passengers) 3,900,000 (commuters 2,535,000, all others 1,365,000).

Lehigh Valley Railroad passengers arriving at and departing from Jersey City numbered 162,000, this figure being included in the total number of Pennsylvania Railroad passengers carried on its two ferries.

The Staten Island Rapid Transit Company carried on its lines in Staten Island (all within New York City) 13,011,958 passengers.

A compilation of the business handled by the leading stations would be as follows:

Grand Central—			
New York Central		20,477,247	
New York, New Haven & Hartford		16,459,882	
			36,937,129
Pennsylvania Station—			
Baltimore & Ohio		330,000	
Lehigh Valley		460,000	
Long Island		23,440,080	
Pennsylvania		11,717,490	35,947,570
Flatbush Avenue, Long Island			33,968,090
Erie			27,377,365
Delaware, Lackawanna & Western			21,553,040
Central of New Jersey			18,136,928

Railroads in the Post-War Readjustment*

By Atlee Pomerene
United States Senator from Ohio

I AM MINDFUL of the many criticisms of our transportation system, and many of them are well founded, but notwithstanding these facts we have the best transportation system in the world, at the cheapest rates per train mile in the world, and with the best paid labor in the world.

I have no defense to make for the executive management of our railroads as it existed 20 or 30 years ago, but the management has been greatly improved, and the class of men who are now the active executives of the great systems of the country are far in advance of the executives of 30 years or more ago. Most of them appreciate the fact that railroad property is not for their private manipulation, but that it is quasi-public property for the benefit of the entire public.

The war reduced the morale not only in private industry, but in the railroad world as well. Part of the shortcomings of every industrial activity is attributable to the war, and we must be very patient with one another when we attempt to criticise too severely. The object of criticism should not be for the purpose of maligning those who have made mistakes, but rather for the purpose of calling attention to them, with the view of curing them. It is in this spirit that I shall discuss briefly the transportation problem.

Theorists suggest government ownership. It is only charitable to say of them that while their intentions may be the best, they never have studied their way through the problems involved. Agitators speak of it, but as a rule they are bent only on destruction of things that are, and care nothing for the future of the country, except as they themselves may profit by the change. The government did many things which it was required to do during the period of the war just as manufacturers and business men, and in fact all other citizens, were compelled to do, which they would not think of doing during a time of peace.

And one of the things which it was necessary for the government to do during the period of the war was to take over and operate the railroads for the purpose of hurrying the manufacture and transportation of our war supplies for the boys who went to the front to fight the battles of democracy and world-freedom.

As a result of government management during these trying times, notwithstanding the great increase in all traffic rates, the government so far has sustained a known and conceded loss of somewhat over $1,200,000,000. When the government took over the railroads, it agreed to return them at the end of government control in as good a condition as they were at the time the government received them. Under this provision of the statute some of the railroads have filed large claims. If the claims of the railroads which are not yet filed shall be proportionately as large as those which have been filed, the total of unliquidated claims will amount to between $1,500,000,000 and $2,000,000,000. Of course, it would be but a wild guess to state what part of this amount must ultimately be paid. Enough is known, however, to make us realize that it will be no inconsiderable amount.

The total railway investment, according to the best estimates that can be made by the Interstate Commerce Commission after they have been trying for six years and more to ascertain the value of these railroads, is about 19,200,000,000 of dollars. The finally ascertained value may be somewhat below or somewhat above these figures. There was a time when there was a great deal of water in these railroad stocks and bonds, but that is not so now, at least to no very great extent. The actual value of the railroads will not be very far from the combined stock and bond issue. I am speaking of the railroads as a whole.

And now what is the situation? Labor has its rights which must be protected. The investors have their rights which must be guarded, and the public has rights which are paramount to all of them. The public has the right to have the best, the quickest, the cheapest transportation obtainable. And while present traffic rates per ton mile are lower in this country than they are in Europe, the public feels that present freight and passenger rates are higher than they ought to be, and I share this view. At the same time we must remember that the total revenues of the railroads cannot be reduced, generally speaking, unless there is a material reduction in the expenses of operation. I do not overlook the fact when I make this statement that high rates in some instances have resulted, as I believe, in the reduction of transportation to the extent that there has been an actual loss instead of an increase in revenues.

That it has been necessary to increase traffic rates I think all must concede. It is impossible to increase expenditures unless you increase the revenue to meet them, and instead of the railroads earning during the last year the 5½ per cent on their investment, the net earnings for the railroads of the whole country during the calendar year 1920 were only $61,-928,626 available for interest and dividends, or less than three-tenths of one per cent.

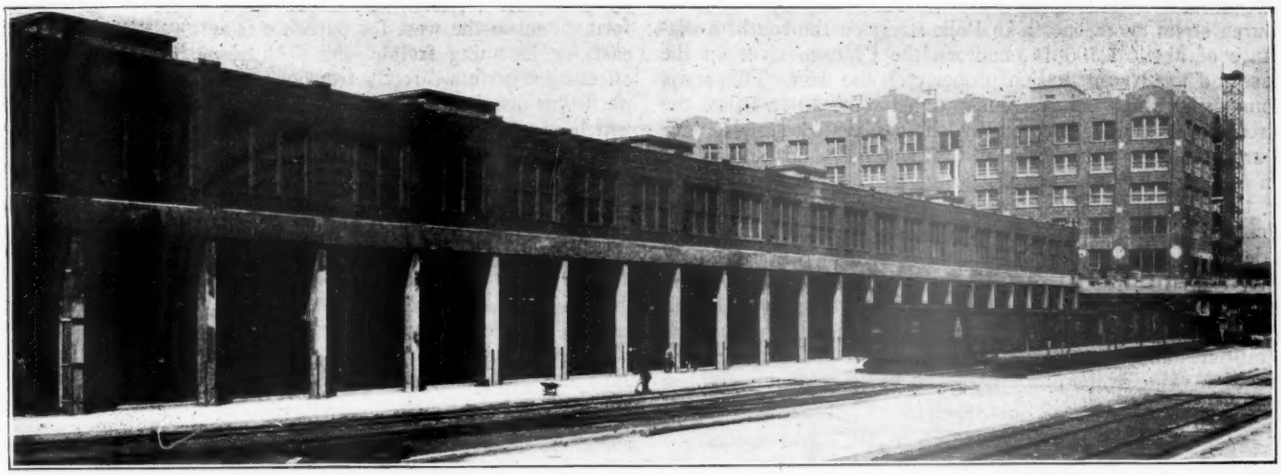
If we take the year March 1, 1920, to March 1, 1921, the net earnings are less than $3,000,000 for the entire railroad systems of the United States.

A few weeks ago a manufacturer of engines came into my office. His company's plant had been operating only part capacity for some time. He had just returned from the south where he went to sell some engines. He met with only fair success. In talking about conditions in his own plant he told me that wages in his shop had increased from time to time during the war until the total wage average increase amounted to 115 per cent over and above the average wage prior to the war. Some weeks ago his company called its men together and advised them that the management in order to get work would be obliged to reduce the price of the product, and that this could not be done unless there could be a reasonable cut in the wage. The company proposed a cut of 15 per cent. All the men in the shop eagerly accepted this proposition except those in one department. They wanted to accept it, but advised the company that their international officers would not allow them to do so. What a fine spirit it showed to have employers and employees getting together in their common interest. How gladly, I imagine, the men accepted this reduction in order that they might have work, and the company might continue to do business. And when all their fellows were accepting, what must have been the feeling of the men in the one department who were not permitted to go to work by their international officers? My judgment is that officers of an organization should do what their men want, and the men should not be dictated to by the few arbitrary leaders.

In this particular instance let me add that before the war the standard engine of this company required 7,000 hours to build it. At the time of which I speak this same engine required 13,000 hours to build it, at an increase of wages of 115 per cent. In other words, as compared with pre-war times the cost of the engine was almost quadrupled.

I am not referring to these conditions in a fault-finding way. I know that during the period of the war the morale of the country was so interrupted that not one man nor one class of men was responsible for the conditions. All must accept their responsibility. It is one of the misfortunes that must be charged to war. I am referring to these conditions with the hope I may help all classes to see conditions as they are, and in order that we all may determine what should be done under present conditions.

*From an address before the Chamber of Commerce, Hamilton, Ohio, on June 14, 1921.

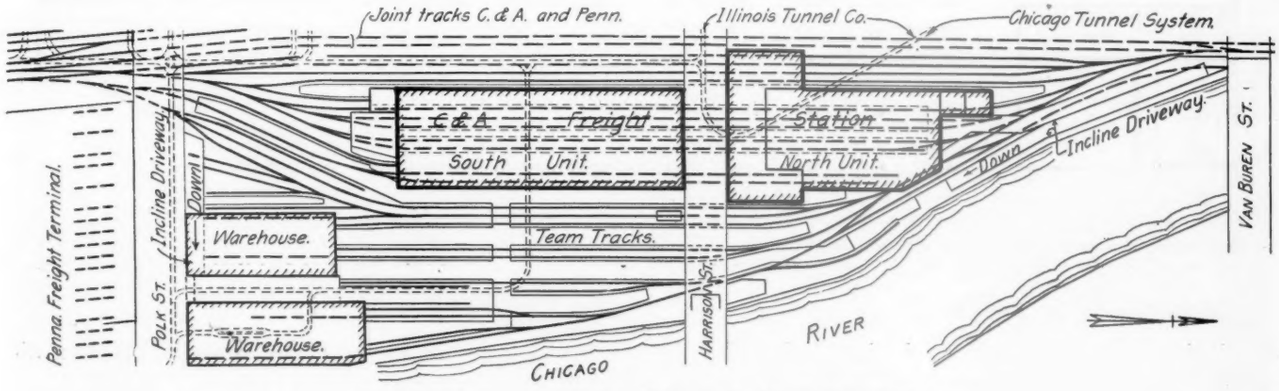


View from South. Team Tracks and East Side of South Unit in Foreground, Harrison Street and North Unit in Background.

New Freight Terminal Nearing Completion in Chicago

Multiple Story Construction and Elevators are Prominent Features of Chicago & Alton Project

THE MULTIPLE STORY principle of freight house operation and the idea of elevator communication between floors find their most recent application in the terminal project which the Chicago & Alton is pushing to completion in the city of Chicago. This involves the replacing of an old freight house with a new one and the extensive revision of a restricted track layout. The new building is a combined freight house, warehouse and office structure, built over the tracks, in which outgoing and incoming freight will be handled separately and all freight, regardless of kind, will be handled between different floor levels by elevators. The building is six stories high, and about three acres in extent. It provides approximately 140,000 sq. ft. of area in track platforms and freight house floors and 50,000 sq. ft. of warehouse space, has about 1,400 lin. ft. and 3,000 lin. ft. respectively of doorways and car platforms, and is located advantageously with respect to the Chicago river, along which the road has about 1,000 lin. ft. of dockage on a level with its tracks.

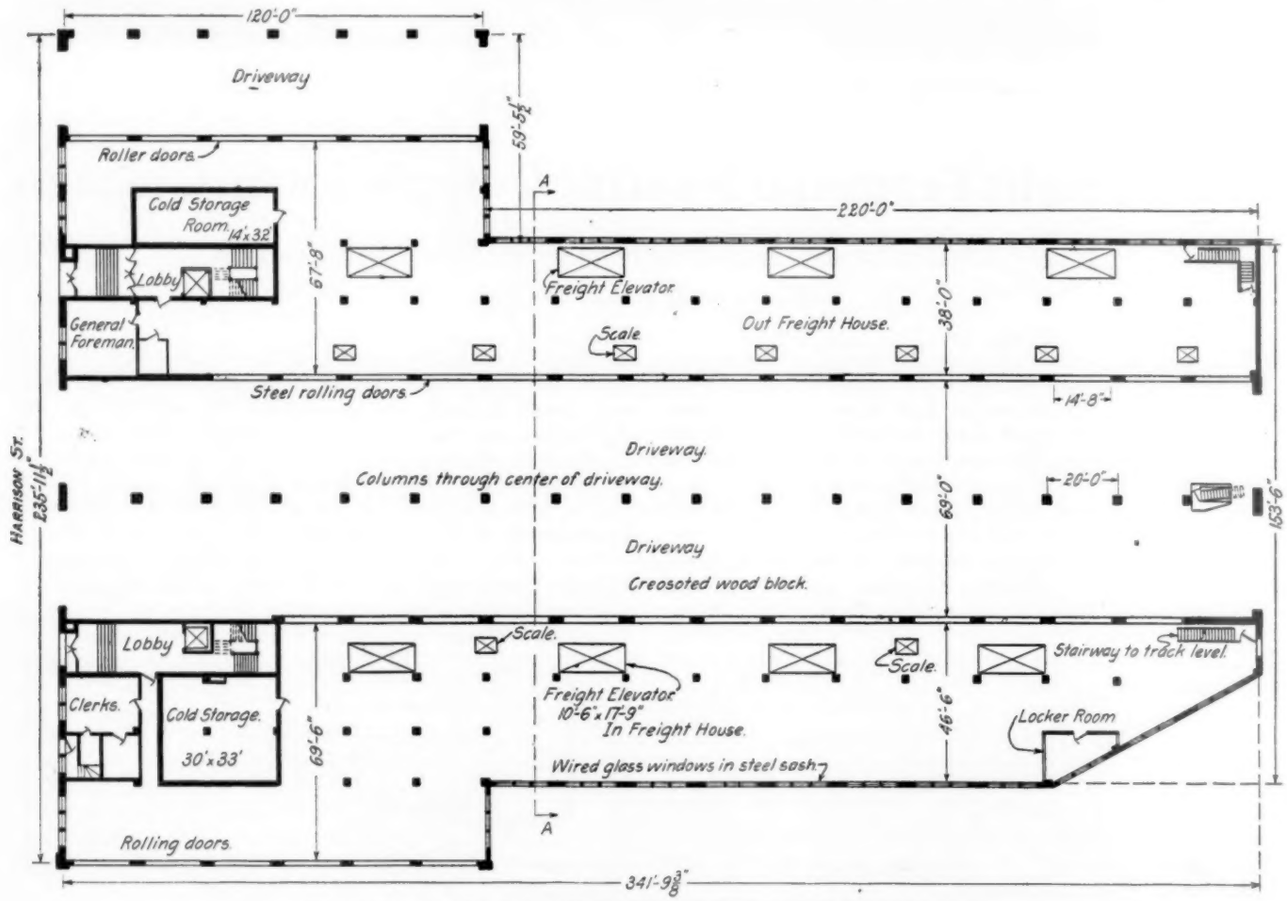


The Track Layout of the Chicago & Alton Terminal

The project had its origin in the need for more adequate freight handling facilities and quarters for its enlarged office organization, the existing facilities being more than half a century old, while the general offices of the company have been confined to rented quarters for several years. With these basic needs present, an inducement for commencing the undertaking was supplied in the necessity which arose for the Alton to abandon its older facilities to make room for the construction of the new Union Passenger Station. Aside from the special engineering and operating features embodied, the project is of interest because of its having been undertaken at a time when the tendency on railroads has been to postpone improvements of this character. Also, associated as it is with the union depot construction, it occupies a place of general interest as a part of a still larger terminal development program, the latter anticipating the remodeling of the entire terminal district in the vicinity of the present union depot through the construction of the new union station (now under way), the Alton layout, the Pennsylvania freight terminal building (already completed) and the proposed freight terminal of the Chicago, Burlington & Quincy.

In determining the design of the layout and the character of the construction several exacting conditions presented themselves for consideration as governing factors. The available ground space was a narrow strip extending from Van

Buren street on the north to Polk street on the south, a distance of about 1,300 ft., between the Chicago river on the east and the Union Station property on the west. This strip, comprising about ten acres, is situated some 20 ft. below the street level and is crossed by three elevated streets, Van Buren on the north, Harrison at the center and Polk street on the south. Furthermore, it is made irregular by the bank of the river and the existence at the Polk street end of two commercial warehouses. It will be bounded along the west side by an elevated street extending from Van Buren to Polk streets as called for by the plans of the Union depot. Added to these conditions and confinements with respect to location were considerations regarding the present and future business requirements, the limitations on funds for construction and the high value of the property, all of which created a problem necessitating close arrangement to detail. In the existence of such factors, the project was begun only after extended studies had been made to the end of minimizing cost and building most advantageously.



Floor Plan of the South Unit Showing Elevator Shafts and Scales

The General Layout

The general layout comprises a building occupying a rectangular area along the west side of the Alton property on both sides of Harrison street. This building, about 900 ft. in its longest dimension and 236 ft. in its widest, is a continuous structure at track level, but at the street level is separated by Harrison street into north and south units, each of which faces on Harrison street. With respect to freight handling it is divided lengthwise into outgoing and incoming houses whereby all incoming freight is handled on one side of the building, while the outgoing is handled on the other. Below the street level the building accommodates three platforms, one on the west for outgoing freight, a second on the east for incoming freight and a third midway between for effecting transfers directly from one car into another. These platforms accommodate elevators at intervals of about 50 ft., which provide the means of communication with the upper floors and also give access to 12 house tracks, seven of which extend through the house and are covered by it for a distance of about 800 ft. and four of which extend along the west side, the remaining track being a short spur at the south end of one of the platforms. These tracks are arranged in groups of four, three, two and two from west to east with respect to the platforms and provide capacity for about 270 cars. Excepting for the two tracks to the east which terminate at the north end of the structure, they may be entered both from the south and the north from the joint main line tracks of the Alton and Pennsylvania, there being one lead at the north and two at the south end of the yard.

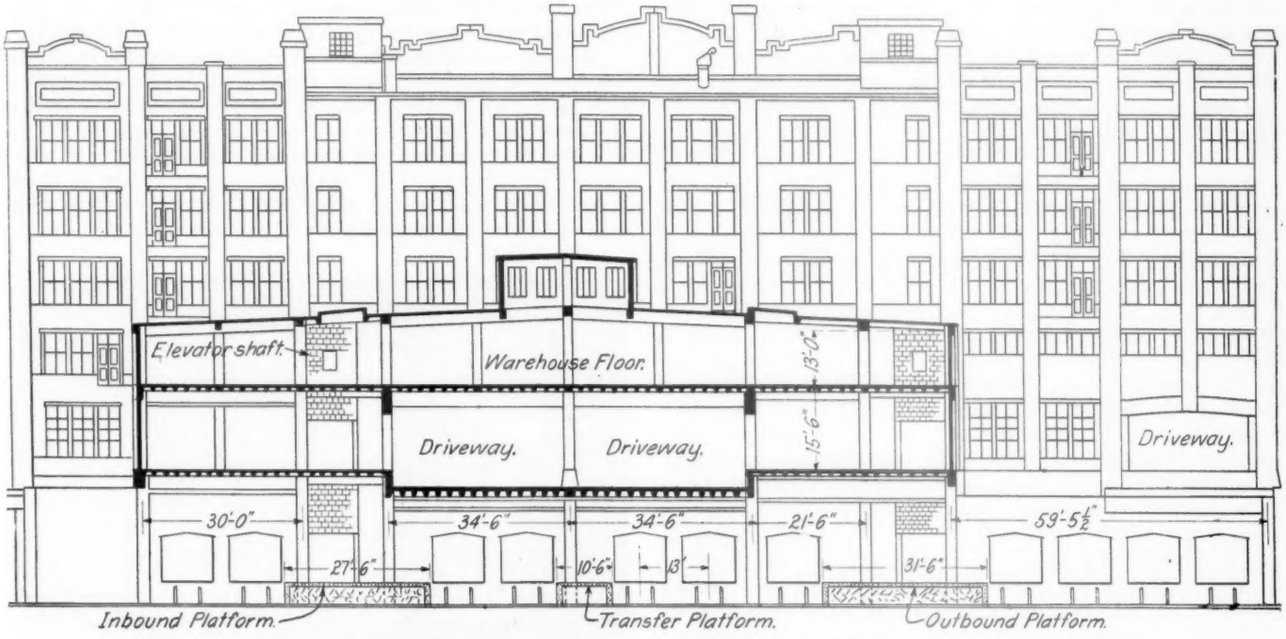
The remaining 20 tracks of the total of 32 in the yard are team tracks. These tracks are arranged in groups separated by concrete pavements and provide capacity for about 165 cars. Access to them will be had by two inclines, one already in existence extending from Polk street and the other to extend south from Van Buren street. The inclines will rise to the street levels on a grade of about 3.5 deg.

The North Unit

Of the two units formed by the intersection of Harrison street, the north unit is the largest. This building, not including the 70 ft. by 30 ft. extension on the rear for power plant and heating purposes, is 340 ft. long, has a street frontage of 235 ft., extends five stories above the street level and, aside from the local freight handling facilities, provides warehouse

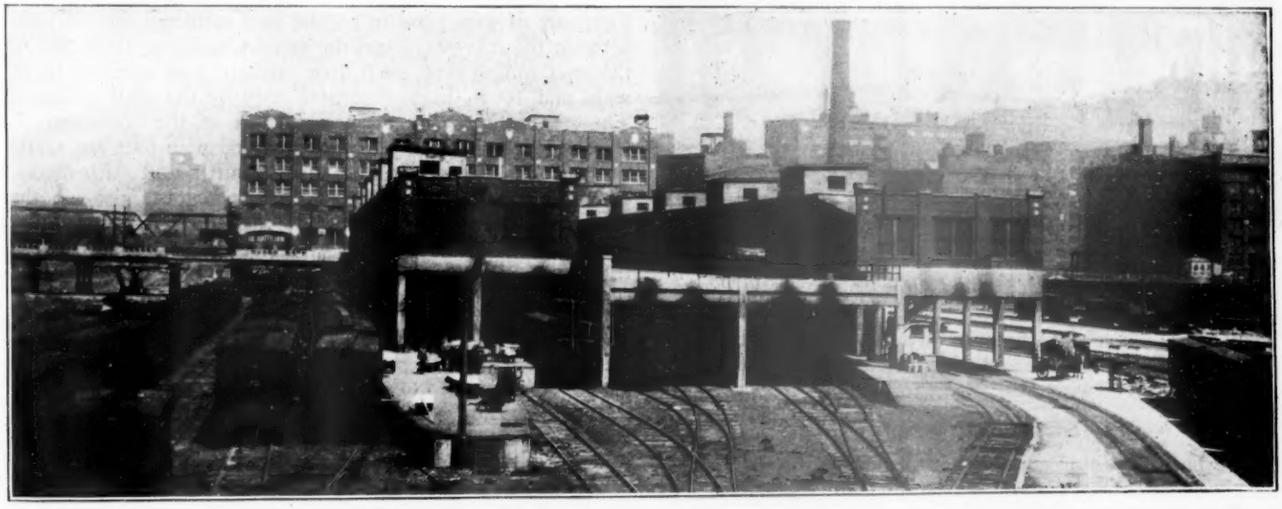
space and quarters for the company's local freight and general office organizations. The local freight business is confined to the first or street floor, all communication with street vehicles being effected at this level while access is had to the car platforms by means of the elevators. The area of the first floor is divided lengthwise into two sections, one intended for incoming and the other for outgoing freight, the sections being separated by a driveway 67 ft. wide. This driveway extends through the house from and on a level with Harrison street and terminates at the north end in a 24-ft. viaduct which, when completed, will provide a connection with Van Buren street. In addition to this central driveway, the plan provides for two side entrances to the building from Harrison street, each to be 30 ft. wide and 120 ft. long. When constructed one will extend along the east side of the building for ingoing freight and the other under the west side of the building for outgoing freight.

This arrangement of the first floor provides about 19,000 sq. ft. of floor space each for the inbound and outbound portions of the house and also affords ready accessibility to the street from all parts of the building. In addition to a stairway, a passenger elevator and four freight elevators (one of the latter being omitted for the present), the platform of each section accommodates a cold storage room and platform scales for weighing, there being eight scales for the outgoing and two for the incoming section. The floor is lighted by closely-spaced windows along each side of the building and by the large open entrances at each end of the driveway.



Section of the South Unit Through A-A, Showing Arrangement of House Tracks and Platforms

The second floor of the building is designed for warehouse and storage use and allows for that purpose the entire area of the building except for the elevator shafts. The space approximates 61,000 sq. ft., communication to it being effected by the several freight elevators which operate between the car platforms and the first floor. This floor is well lighted by windows on the sides and ends of the building and by large and high monitors above the center.



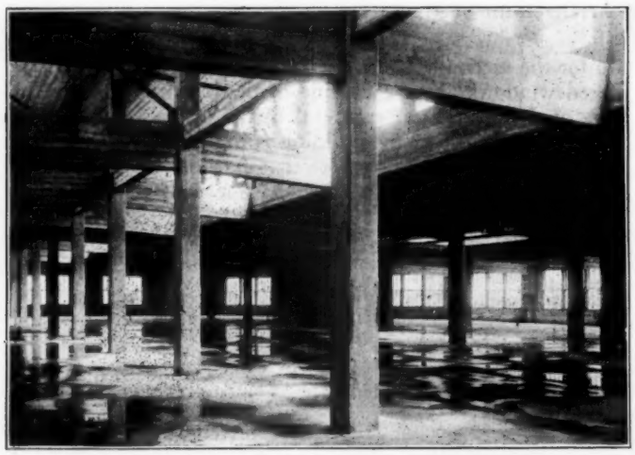
Looking North from Polk Street. South End of Freight House in Foreground

The third, fourth and fifth floors of the building will be devoted to the needs of the local freight and general offices

of the company. These floors extend only above the front end of the building and provide about 20,000 sq. ft. of office area. According to the plan the third floor will be occupied by the offices of the local freight agent, telegraph and telephone department, superintendent of car service and a lunch room; the fourth floor, by the controller's and auditor's forces and the fifth floor by the executive offices and the engineering, transportation, purchasing and freight and passenger departments. Two elevator and stairway units, one unit on each side of the building, will furnish access to the street and to the roof, the latter to be surrounded by a four foot parapet and prepared for recreation purposes.

The South Unit

The south unit of the terminal structure is confined to one story above the street level and appears as two separate buildings, an inbound and an outbound house separated by a common driveway. This building is 460 ft. long and 154 ft. wide and is devoted entirely to freight handling. As such it differs from the north unit in three particulars. The car platform of the outbound house extends beyond the south end of the building sufficiently to accommodate a crane by means of which heavy objects may be transferred directly from street vehicles to the cars. Also the house like other terminals in the business center of the city provides accommodations for the transfer of freight with the Chicago Tunnel Company. By means of elevators tunnel cars can be transferred directly from the tunnel to tracks on the trucking floors. A further feature of this house lies in the relation of the incoming house to the team tracks by reason of which the two tracks extending under the east side of the building can be utilized as team tracks as well as house tracks. Similarly to the north unit, the driveway to this unit is an extension from Harrison street and when desired may be prolonged south to intersect with Polk street.

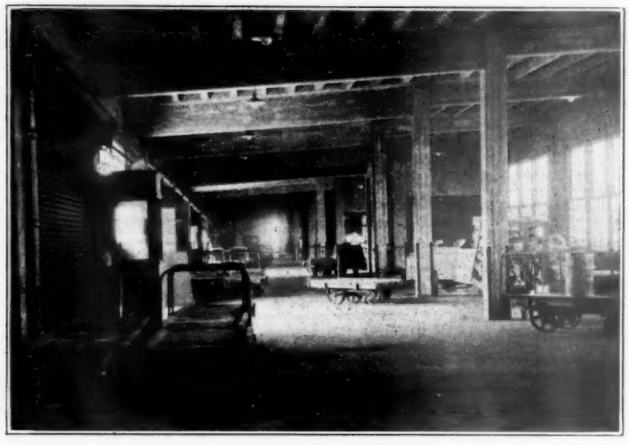


Interior View of Second Floor of North Unit. Floor in Process of Curing

Structural Details

The building is of concrete-encased steel frame construction with brick walls and terra cotta coping and floors of reinforced concrete. It presents a number of interesting features in design, chief among which are the close attention given to lighting and the supporting of that portion of the four story section which extends over the four tracks on the west side by 60-ft. trusses. Two types of foundations support the structure, that under the south unit consisting of concrete pedestals carried on piles, while that under the north building consists of concrete piers carried down to hard pan or rock by the open caisson or Chicago method. There are 125 of these caissons, one under each column except in two instances where the presence of a tunnel of the Chicago Tunnel Company required the supporting of the columns on a reinforced concrete beam spanning between adjacent piers. These beams are 5 ft. by 9 ft. in cross section. The caissons vary in diameter from 4½ ft. to 6½ ft., extend to an average depth of 60 ft. and rest on hardpan except in one instance, where bedrock was encountered.

The floor construction varies throughout the building. The car platforms are concrete on cinders and the floors above the street level are, in general, of the T-slab type construction patterned after the Branson system of joist molding, whereby the many joists supporting the slabs flare at each end. The car platforms and floors of the south unit are surfaced with asphalt mastic. All other platforms and floors are finished in "Carborundum," a mixture of carborundum dust with cement. The office floor hallways and the stairways are to be laid with "terraza." The roadways will be paved with creosoted wood block and the roof covered with asphalt mastic.



Interior View of Outbound House of South Unit

All windows in the first and second floors and the skylights are of wire glass in hollow steel sash and the 84 doors between the driveways and the freight handling floors are of the steel rolling type, each door protecting an opening 16 ft. wide and 10 ft. high, separated only by the wall pilasters. The storage space on the second floor of the north unit is subdivided by a brick fire wall provided with four automatic tin-clad fire doors. In the third, fourth and fifth floors, expanded metal on the floors and floor joists provide the surfacing for plaster and on the fifth floor a false ceiling will be hung several feet below the roof. Partitions between the offices in general will be wood and glass while hollow tile will comprise the walls of all vaults and elevator shafts. The direct system of electric lighting is to be used throughout the building.

Elevators

With the knowledge that in the final analysis the efficiency of the house will depend upon the elevators, this subject received particularly careful attention with the result that provision has been made for 17 automatic elevators, each of 5 tons' capacity. These elevators are electrically operated by means of push buttons. The buttons are located on the outside of the shaft as well as in the cage, by which arrangement the operator may or may not follow the elevator and the operation of the elevator is such that regardless of weight carried the platform automatically will come to a stop at the exact floor level. The elevator system also provides steel doors in the shafts, which are counterbalanced to effect easy operation and which both prevent their being opened from

the outside and make impossible the rising of the elevator in the shaft until they are closed. By means of these elevators the system of operating the house is such that outgoing material received from street vehicles on the first floor is transferred to the scales, thence to the elevator and from there lowered to the track level platform and loaded into the cars. It is the intention of the Chicago & Alton in operating the house to require the men handling the material on the first floor to follow the freight entirely through the process of handling. Should occasion make it desirable, however, the system is one which will enable the work to be accomplished by separate gangs, each confined to a single floor.

This structure has been designed and erected under the direction of W. T. Bierd, president, H. T. Douglas, Jr., chief engineer, and W. F. Rech, bridge engineer of the Chicago & Alton, and is being built by the Dwight P. Robinson Company, New York. The south unit of the terminal is completed and has been in operation for several weeks while the construction of the north unit is expected to be far enough along to permit of its opening for operation by July.

Labor Leaders Meet at Chicago to Determine Policy on Wage Reductions

THE GENERAL CHAIRMEN and chief executives of the labor organizations affected by the recent wage cut order of the Railroad Labor Board met at Chicago on July 1 to consider and pass upon the wage reductions which went into effect on that date. Prior to July 1 strike talk was rife but as the meeting continued the conservative element in the ranks of the various organizations led by the "big four" brotherhoods obtained control of the situation and on July 5 several spokesmen of the labor organizations stated that anything in the nature of a strike in protest against wage reductions was "more than remote."

Soon after the various organizations convened a committee of five representatives of the 16 larger railway unions was appointed. This committee, which is headed by B. M. Jewell, president of the Railway Employees' Department of the American Federation of Labor, and composed of F. H. Fitzgerald, president of the Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station Employees; L. E. Shepard, president of the Order of Railway Conductors; E. J. Manion, president of the Order of Railway Telegraphers, and Timothy Shea, vice-president of the Brotherhood of Locomotive Firemen and Enginemen, will formulate the policy of the railway employees toward the wage decrease order of the Labor Board. The committee subsequently received daily reports from the various group meetings in progress and will prepare general recommendations for submission to the union's membership.

After the meetings had been in session it developed that the maintenance of way employees, clerks and shop men, together with the firemen and oilers, as a group are strongly opposed to accepting the decreases ordered for these employees by the Labor Board, whereas the train service organizations are seriously considering an "informal acceptance" of the Labor Board's decision. Later developments indicated that the conservatism of the "big four" brotherhoods was acting as a check upon the more radical representatives of the maintenance of way, clerks' and other organizations.

The great differences of opinion held by the representatives of the workers at the various group meetings led on July 2 to the appointment of a committee of ten in each of the organizations to draw up a program. When these various programs have been completed and approved by the representatives they will be submitted to the committee of five which, in turn, will consolidate them into one program which will then be submitted to the organizations for approval or rejection.

On July 3 it became apparent that the abrogation of rules and working conditions ordered by the Labor Board to be effective on July 1 and later indefinitely postponed, accounted to a large extent for the dissatisfaction of the employees as expressed in referendums on the wage reductions. When the more radical representatives became thoroughly informed as to the present status of the national agreements and of the various interpretations of Decision 119 which have been issued by the Labor Board, peace sentiment gained rapidly.

Factional differences within the organizations rendered a final decision as to labor's attitude at the present time impossible on July 4 and it became necessary to continue the meetings on July 5.

The train service organizations finally decided upon a plan of action late July 5 with the adoption of a resolution providing for a referendum vote of the membership of the train service brotherhoods as to whether the wage cuts recently ordered by the Labor Board will be accepted or rejected.

This referendum is to be taken not later than September 1 and in the meantime an effort will be made to arrange a conference between the Union chiefs and the railroad executives. The resolution adopted by the brotherhoods said in part:

Whereas, The general chairmen are required not only to consider wage reduction but in many instances railroad officers have served notice of their intention to abolish time and one-half for overtime in road freight and yard service and in addition thereto to revise schedules for the benefit of the railroad by abolishing many rules and conditions which in the aggregate mean loss of much money and creation of less favorable conditions for various classes of employees and

Whereas, Much unrest and uneasiness exist which cause deep concern, add to seriousness of the situation and establish a condition of affairs which makes it practically impossible for this body of general chairmen to take responsibility of deciding these important questions for the reason that we hold that no reduction in wages of various classes is justifiable and

Whereas, It is the earnest desire of the representatives assembled to do everything possible compatible with their duty to those whom they represent to avoid any inconvenience or loss to the public, and

Whereas, In keeping with this thought we hereby authorize and direct our executive officers to acquaint those in authority with these resolutions; further that they call attention to the fact that certain carriers, namely the Missouri & North Arkansas and the Atlanta, Birmingham & Atlantic have disregarded decisions and flouted authority of the Railroad Labor Board, and

Whereas, Despite all these provocative circumstances coupled with a common desire to refrain from taking any action that might precipitate a deplorable situation we

Resolve, That the general chairmen cannot assume the responsibility of accepting wage reductions and that not later than September 1, 1921, the entire subject matter be referred to the membership through the various general chairmen for acceptance or rejection,

Be it further Resolved, That we authorize our chief executive to make arrangements if possible to meet a committee of railway executives to be selected to meet the subcommittee representing the organizations named herein to consider and if possible adjust all matters in controversy and that our chief executives and committees handling these questions be directed clearly to place the representatives of the railway corporations on record as to whether or not they will request further decreases in rates or compensation, abolition of schedule rules or regulations or elimination of time and one-half time.

The ballot when submitted to the men shall contain an impartial and unbiased recital of all that is involved and the wishes of men as expressed by ballot shall determine the matter in accordance with the laws of the representative organizations.

It is believed that the other labor organizations will follow the lead of the brotherhoods and accept the wage reductions under protest, taking at the same time a decided stand on the abrogation of the National agreements.

Pullman Shop Employees' Wages To Be Reduced

The shop employees of the Pullman Company will receive the same wage decreases as were ordered for the shop employees of the carriers in the Board's Decision No. 147, according to a ruling announced on July 2.

Hearings Before Senate Committee Adjourned

Committee Members Show but Small Interest—Prospects for Little Railroad Legislation at This Session

WASHINGTON, D. C.

THE HEARING before the Senate Committee on Interstate Commerce, which has been inquiring into the railroad situation for several weeks, was adjourned on July 1 to a date to be fixed later by Chairman Cummins in the latter part of August or about the first of September. Chairman Cummins' announcement merely stated that it was felt advisable to adjourn the hearings during the hot weather. It has also been proposed in the Senate to take a series of recesses during July and August. Very little interest has been displayed in the railroad hearing during the past two or three weeks by members of the committee. Seldom have more than three or four members been present and on several days Senator Cummins was the only member of the committee present. He has now been ordered by a physician to take a rest and the committee will hold no hearing of any kind during the next month. Testimony on behalf of the National Association of Owners of Railroad Securities was completed on July 1, although S. Davies Warfield, president of the association, may appear again when the hearings are resumed. The committee had had comparatively few requests from representatives of the shippers for opportunity to be heard and, while it had been arranged with representatives of the labor organizations to appear on July 5, they had asked for a later date. They had originally asked to be heard after the other testimony had been presented.

Prospects for Little Railroad Legislation at This Session

Now that the Frelinghuysen seasonal coal rate bill has been practically killed by vote to recommit it to the committee, there are prospects for very little, if any, railroad legislation at this session. A large number of bills introduced to amend the Transportation Act, practically all of which were originated by those who are unfriendly to that law and opposed it at the time of its passage, have been referred to committees, where no action has been taken on them.

While the hearing before the Senate committee has indicated no prospect of any definite results, it has afforded an opportunity to the railroads to give a public explanation of the situation. The investigation was started at a time when a good many people were making charges that the large increase in railroad expenses in 1920 after the railroads were returned was due to extravagance and that the decrease in railroad traffic was mainly due to the latest advance in freight rates. The railroads were able to show conclusively that the largest part of the increase in expenses was due to the wage award and other increases in payroll which resulted from the national agreements and wage orders issued by the Railroad Administration during the last few weeks of its existence, while there were also large increases in the cost of fuel and other expenses, over which the railroads had very little control. The hearings have also served to convince at least a majority of the committee, apparently, that the diminution of traffic was due to general business depression in no way related to freight rates and that even if freight rates were too high a repeal of the 6 per cent rate-making rule of the Transportation Act would not in any way affect the situation since the advance in rates has at no time been sufficient to pay a 6 per cent return even during the months of the heaviest traffic last fall.

Director Colston Submits Written Statement Outlining Views

At the request of Senator Cummins, W. A. Colston, director of finance of the Interstate Commerce Commission, submitted a written statement on June 30 outlining his views regarding the organization proposed by the National Association of Owners of Railroad Securities and the bills for the federal incorporation of the National Railway Service Corporation and to promote further economies and efficiency in railway transportation.

He said there was no doubt in his opinion that the corporation under a federal charter would continue to accomplish in part at least the benefits realized under its state charter, namely, the extension of credit to carriers which otherwise could not obtain credit and the reduction of interest rates, discounts and commissions on moneys required by railroads.

Without provision for adequate capital, however, he said, these benefits would be limited by amounts available under section 210 of the Transportation Act, or by similar provisions under future laws, and the work of the corporation would be handicapped, as the State corporation has been, by the unwieldy forms of equipment trust agreements, etc.

"I think that the proposed corporation could be made a much more virile and helpful institution if the bill were amended in the following respects," said Mr. Colston.

"First. In order that there may be no fear or suspicion of private profit or benefit growing out of the activities of the federal corporation, the act of incorporation should distinctly provide that the assets and profits of the corporation shall be the assets and profits of the United States, to be administered by the managers of the corporation, as trustees or fiduciaries, solely in the interest of commerce and of the people of the United States. Instead of providing, as is now done by section 10 of the bill, that the corporation shall issue no shares of stock, it might be well to provide that all of the capital stock of the corporation shall be issued to and held by the United States. The loans, leases, underwritings and other major operations of the corporation should be under the control or subject to the supervision of the Interstate Commerce Commission just as loans are now made under section 210 of the Transportation Act under the direction of the commission. But transactions incidental to carrying out the general enterprises authorized by the commission should be performed by the corporation's officers and trustees just as business of a private corporation is carried on by its officers and an executive committee under the general authority of the directors or stockholders.

"Secondly. The business of the corporation should be simplified by providing that the corporation itself shall make the loans, underwrite the securities, or exercise the other activities contemplated, upon direction or approval of the Interstate Commerce Commission, without the necessity for multiplying transactions between the commission and the Treasury, between the Treasury and the corporation, and between the Treasury and the carriers. And to the extent of its assets or capital stock the corporation should be permitted to underwrite, as well as buy, sell and loan upon, the securities of carriers, but should, of course, not be permitted to bind the United States by its underwritings or agreements, except to the extent of the assets turned over to the corporation and the profits therefrom, or to such

further extent as may be specifically authorized by law.

"Thirdly. There should be turned over to the corporation, as the basis of its operations and to be held, administered and dealt in as trustee, for the uses and purposes for which it is created, all railroad securities of any kind now held directly or indirectly by the United States government, all balances in the revolving fund created by section 210 of the Transportation Act, 1920, and all the accretions of the general railroad contingent fund provided for by section 15a of the Interstate Commerce Act. A rough estimate of the assets now or prospectively dormant and available for such purposes, in addition to the accretions which may be expected for the general railroad contingent fund, may be obtained from a consideration of the following:

In June of last year the War Finance Corporation held securities of railroads amounting to $64,658,210. It is probable that the greater part of this sum is still unpaid.

On April 30, 1921, the Treasury held obligations of carriers acquired under section 7 of the Federal Control Act, approved March 21, 1918, as amended, amounting to $66,047,250, and equipment trust 6 per cent gold notes acquired by the Director General of Railroads pursuant to the Federal Control Act of March 21, 1918, as amended, and the act approved November 19, 1919, to provide for the reimbursement of the United States for motive power, cars and other equipment ordered for carriers under federal control, amounting to $310,098,300, and obligations of carriers acquired pursuant to section 207 of the Transportation Act, approved February 28, 1920, amounting to $89,506,500.

The revolving fund of $300,000,000 created by section 210 of the Transportation Act has been increased by accrued interest, and if other provision is made for payment of judgments against the Director General now required to be paid out of this fund we may set down the assets and balances in the fund as amounting to something over $300,000,000.

The carriers are now seeking the funding of additions and betterments during federal control amounting to approximately $750,000,000.

The obligations held for advances to carriers under the Federal Control Act are subject to some changes growing out of the final settlement of the carriers' accounts with the Director General, but we may say in round figures that if the request of the carriers to fund additions and betterments during federal control is granted we shall have in sight dormant or frozen assets amounting to about $1,500,000,000, which, if turned over to the proposed corporation, could probably be made the foundation of a financial power of $4,500,000,000, an amount sufficient, apparently, to finance the needs of all of the railroads of the United States for many years.

"Incidentally to the amendments suggested there should be provisions to permit the making indefinitely of loans by the corporation, on order or approval of the Interstate Commerce Commission, out of its funds or assets, including the balances and assets arising from the operations of the revolving fund under section 210 of the Transportation Act, 1920, and there should be either no limitation of the time for which loans may be made or the time should be considerably extended beyond the period of 15 years now permitted by section 210 of the Transportation Act. The average life of equipment is considerably more than 15 years, and under the restrictions of section 210 of the Transportation Act it was impossible to arrange for the purchase by the National Railway Service Corporation (or any other organization effected for the purpose) of equipment to be held by the corporation and leased to carriers generally. As will appear from the table submitted in my testimony of today, and showing the amortization at 6 per cent of equipment on basis of 4½ per cent return on original investment, and with depreciation rates of 4 per cent and 5 per cent, respectively, the National Railway Service Corporation could buy equipment in quantity and lease such equipment to carriers indefinitely on basis of 4½ per cent return on original cost of equipment plus depreciation, the carrier, of course, making the repairs. With such central ownership, benefits of a standardization of cars and of use of cars where needed to meet seasonal requirements, etc., could be largely realized."

Relative to the bill providing for the promotion of further economies and efficiency in railroad operation, Mr. Colston said in his opinion the creation of formal organizations on the part of the railways and men of financial experience as proposed by the Warfield organization would be of great benefit in furthering economies and efficiency, particularly in the matters of standardization of equipment, common use of terminals and universal interline billing. He said it was his belief that the greatest difficulty in the way of accomplishing those results in the past has been through the lack of power or failure to exercise power to make mandatory the conclusions of those who have studied the several subjects. He said the proposed bill should confer on the commission the power to act upon recommendations made by the proposed service board or of any of the group boards, because if the recommendations could not be made mandatory the act would be of no effect.

Director Colston said he wished it understood he had prepared his statement hastily and that it represented his personal views and not in any way those of the commission.

Views of American Manufacturers' Association

H. A. Holmes, representing the American Manufacturers' Association, told the committee that members of his association stand ready to provide $100,000,000 a month for a year to enable the government to pay its debts to the railroads, which he estimated at about that amount, receiving in return 5½ per cent tax-free Treasury certificates. Senator Cummins said that the Railroad Administration owes the roads about $700,000,000 and has on hand about $235,000,000, whereas the roads owe the government for capital expenditures about $750,000,000. If the President decides to fund the indebtedness of the railroads, he said, a situation might arise in which Mr. Holmes' proposition would be very interesting.

Walter L. Fisher Urges Legislation in Favor of Co-ordinating Facilities

Walter L. Fisher, counsel of the Chicago Railway Terminal Commission, urged upon the committee the importance of legislation which will compel the better co-ordination of railroad facilities by grouping or consolidation and by unification of terminals along the lines suggested by Chairman Clark of the Interstate Commerce Commission in his testimony before the House Committee on Interstate and Foreign Commerce in 1919, in which he advocated that a beginning be made by consolidation of terminals under terminal associations or companies under a single management. Mr. Fisher said that the fundamental difficulty of the whole railroad situation is the failure of the public, the government agencies and the railroads to keep in mind the inherent character of the railroad business. He said he is not an advocate of immediate government ownership and would be reluctant to state the date for government ownership, but every time we fail to have definitely in mind the fact that a railroad is a government agency we get the wrong point of view. The railroads are performing a function of government, he said, yet the railroad executives are constantly disposed to ignore that fact except when they want help from the government on the ground that they are performing a public service. There is an unsound and uneconomic duplication of terminal facilities which are only superficially used, he said, yet many railroad executives claim that the advantages of competition overbalance the advantages to be derived from unification. Yet, he said, this spirit of competition amounts to very little from the public standpoint and is little more than a talking point for a railroad that has better facilities than another in soliciting freight.

In the matter of service, he said, the railroads find that if they compete too much they get into destructive competition and so they agree to limit it. The unification carried

out under the Railroad Administration, he said, was so successful that many railroad officers who were concerned with it boasted of it, although they had previously opposed unification, while it is difficult now to get them to admit the advantage of unification because of the attitude of their superiors, and unless there is some strong authority to compel unification, the movement will not get very far.

The Interstate Commerce Commission, he said, has no greater opportunity for usefulness than to make a real study of the possibilities of unification to determine the facts, and if it does not have the power should have the power to put its recommendations into effect. People who regard government ownership with apprehension should realize that the danger of government ownership is increased by their failure to recognize the necessity for co-operation and co-ordination and their insistence on the competitive theory. This, he said, is doing more to force premature government ownership than anything else. In some respects, he said, the railroad executives are doing remarkably well, but they are so reluctant to give up advantages which one road may possess over another that some compelling power is required. Senator Cummins pointed out that the Interstate Commerce Commission now has power to compel the common use of terminals and facilities. Mr. Fisher assented, but said that power is tied up by the necessity for fixing the value of the property to determine the proper compensation. He believed the Supreme Court would sustain the theory that back of all the titles to property lies the obligation to perform the public service and, while he would be the last to say that a railroad ought not to receive a fair return, it should only receive a fair return, but, he said, the railroads want to capitalize the disadvantage of a competitor. He said that the railroads are appealing to congress for help, but before Congress responds they should be compelled to adopt measures that will promote a more economical use of the facilities.

Mr. Fisher said it was gratifying to observe the efforts of the bondholders, as represented by Mr. Warfield's organization, to take a more active part in railroad affairs. The railroad executives, he said, resent it and are inclined to treat the bondholder as a mere creditor, but they fail to recognize the inevitable tendency of railroad financing in the future. Because the railroads have not been able to sell stock at par they have been driven to issue bonds and the real owners of the railroads have come to be the bondholders. The real problem is how to raise additional money for the railroads and to do so it is necessary to stabilize railroad securities. That means that the bondholders have got to come to the front and they ought to be invited to do so.

Mr. Fisher said he did not believe the existing Interstate Commerce Act reaches the difficulty in the way of a greater co-ordination of railroad facilities and that the permissive provisions as to consolidation certainly are insufficient, particularly as very little sympathy has been manifested on the part of railroad officers toward a grouping of the roads. Senator Cummins said that he agreed that the act does not go far enough and that the Senate had favored a compulsory consolidation law. Senator Cummins asked if this would not have to be done by some public agency because of the difficulty of raising capital enough for it to be accomplished by a private company. Mr. Fisher said that if the Interstate Commerce Commission would revise the rate divisions so that the rates would provide on terminal properties the same rate of return that is allowed on railroad investments generally there would be no difficulty in getting capital. He said it would not be necessary to condemn the terminal properties or pay for them, but the title can be left where it is, but the Interstate Commerce Commission could be empowered to compel the properties to be turned over to a company that would operate them in the common interest.

Derailment of Passenger Train Ascribed to a Split-Head Rail Failure

THE CHIEF of the Bureau of Safety of the Interstate Commerce Commission calls attention to the dangerous character of split-head rail failures in a report on a derailment occurring on the Chicago Great Western near Wyeth, Mo., on January 3, 1920. This is based on an investigation by the engineer-physicist, James E. Howard, which has led to the conclusion that the derailment was caused by rail failure of this type. The report goes into considerable detail as to the nature of these rail failures, carefully differentiating them from piped rails. Considerable data are also presented, designed to indicate the influences leading to this type of rail failure. Excerpts from this report follow.

In rails with split heads a longitudinal, vertical plane of rupture is developed, located along the middle of the width of the head. The origin of the plane of rupture is an interior one, located about ¼ in., more or less, below the running surface of the head. The shallow zone above the origin of the rupture remains unbroken until the last stages of failure are reached. In the development of the split head the plane of rupture extends downward until abreast the junction of the head and the web. Here it commonly bifurcates, the branches extending right and left toward the fillets under the head. Final rupture occurs by the complete separation of the halves of the head and their detachment from the web.

Split-head rails are often erroneously reported as piped rails. The primary causes which lead to the failure of these two types are distinctly different, and their origins are located in different parts of the cross section of the rail. A split-head fracture has its origin in the upper part of the head. A piped rail has a plane of separation in the web and lower part of the head. Split-head rails are of frequent occurrence, while piped rails are not. A split-head fracture may occur in conjunction with a piped rail as the present rail shows—a matter not affecting their separate origins.

It will be inferred from the present exhibit and the remarks which are submitted that relatively there is a greater tendency, under the influence of track conditions, for a rail to fail by the development of a split head than by reason of the presence of a pipe.

Mr. Howard also presented a report on micrographic studies showing evidence of flow of the metal in the upper portion of the rail head as a result of which he presents the following statement concerning probable cause of the failure:

In summation, the failure of the rail which caused the present derailment was due to the presence of a split-head fracture. Wheel loads cause distortion of the grain of the steel and induce lateral flow of the metal at the running surface of the rail, the tendency of such loads being to spread the railheads. The successful resistance of such lateral forces depends upon the structural soundness of the metal in the railhead. Longitudinal streaks are lines of weakness which influence the formation of split-head fractures and locate their incipient points of origin. Longitudinal streaks are due to casting and mill conditions. Their elimination, or reduction in numbers and gravity of development, are matters for the steel makers to consider. The ages at which split-head rails manifest themselves indicate such fractures are of slow and progressive development. It is a matter of conjecture, although having the appearance of probability, that split-head rails would be unknown if strictly seamless steel was available for rails. The rail problem is intensified by reason of the employment of high wheel pressures. Soft rails display mashed heads. Hard rails furnish a large number of transverse fissures.

There is a popular fallacy entertained that split-head rails do not constitute a dangerous type of fracture, since at certain stages in their progress of rupture they may be detected in the track. This evidence, however, is presented at a late stage, after the necessary margin in strength in the rail has been practically exhausted, and not prior thereto. An element of danger has arisen when split-head rails are detectable in the track. An economic question is involved in the elimination of the causes of split-head failures, since many rails are removed for this cause which are not otherwise unserviceable. Finally, split-head failures should not be reported as piped rails.

A ROUGH GAME. "What has become of the tin locomotive and the train of cars I gave you on your birthday?"

"All smashed up," replied the small boy. "We've been playing government ownership."—*Exchange.*

The Delaware and Hudson's New Car Service Rules

Revised Rules for Promoting Prompt Car Movement Simplified for the Benefit of Yardmasters

A VERY successful wording of the rules for the guidance of station agents and yardmasters in the prompt and economical movement of foreign freight cars is that of the Delaware & Hudson Company and a reprint of these rules is given herewith. This code has been in use for over a year, but it has now been revised to conform to the changes, going into effect July 1, which have just been adopted by the American Railway Association and it will be found of interest as an example of a concise arrangement of the matter in concrete form, most suitable for the agents and clerks, who will use it, free from some of the technical details which are necessarily included in the American Railway Association circular, but which are not required in everyday use.

These rules are printed in large type, on the two inside pages of a four-page leaflet 9 inches by 11 inches, and are embraced under eight heads as shown. When the leaflet is opened out the two inside pages form a convenient poster to put up on the wall of a yard office; and the two outside pages are used to show: (1) the map (reproduced in the illustration reduced one half in width and height) designed to aid the agent in selecting the most suitable cars for use in loading freight to points on other roads and (2) the mileage chart (reproduced full size) for use in short-routing foreign cars which are to be sent home empty.

The rules, with the map and the mileage chart, have proved their adaptability to their purpose by reducing to a minimum the volume of messages from yardmasters to headquarters asking for instructions about routing. The map, it will be seen, is well adapted to be a powerful aid to the yard clerk in the attempt (which he must never relax) to keep in mind the railroad geography of the whole country and the bold-type subheads in the instructions enable him, in each instance, to avoid wasting time on paragraphs which do not apply to the question in hand. For example, if he is dealing with a private-line car, he reads only the short section devoted to those cars.

It will be noted that these only do not include the new portion of Rule 2 under which two roads, connecting, may agree on exceptions to one of the requirements of that rule.

BETWEEN	Buttonwood P. R. R.	Wilkes-Barre C. R. R. N. J.—L. V.	Scranton D. L. & W.—Erie	Jermyn Tfr. N. Y. O. & W.	Honesdale Erie	Carbondale Erie—N. Y. O. & W.	Owego L. V.	Binghamton Erie—D. L. & W.	Nineveh	Sidney N. Y. O. & W.	Oneonta U. & D.—O. & H.	Cobleskill	Delanson	Schenectady N. Y. C.	Albany N. Y. C.	Troy N. Y. C.—B. & M.	Eagle Bridge B. & M.	Mechanicville B. & M.	Saratoga	Ft. Edward	Rutland Rut. R. R.	Whitehall	Ft. Ticonderoga Rut. R. R.	Port Henry L. C. & M.	Saranac Lake N. Y. C.	Plattsburgh	Rouses Point G. T. C. Vt.—Rut.—N. J.
Rouses Point	373	373	354	342	364	337	327	304	280	264	243	207	189	174	191	184	179	172	152	135	137	113	89	74	96	23	0
Plattsburgh	353	350	331	319	341	314	304	281	257	241	220	184	166	151	168	161	156	149	129	112	114	90	66	51	73	0	
Saranac Lake	420	417	398	386	408	381	371	348	324	308	287	251	233	218	235	228	223	216	196	179	181	157	133	118	0		
Port Henry	302	299	280	268	290	263	253	230	206	190	169	133	115	100	117	110	105	98	78	61	63	39	15	0			
Ft. Ticonderoga	287	284	265	253	275	248	238	215	191	175	154	118	100	85	102	95	90	83	63	46	48	24	0				
Whitehall	263	260	241	229	251	224	214	191	167	151	130	94	76	61	78	71	66	59	39	22	24	0					
Rutland	287	284	265	253	275	248	238	215	191	175	154	118	100	85	102	95	62	83	63	46	0						
Ft Edward	241	238	219	207	229	202	192	169	145	129	108	72	54	39	56	49	57	37	17	0							
Saratoga	224	221	202	190	212	185	175	152	128	112	91	55	37	22	39	32	40	20	0								
Mechanicville	219	216	197	185	207	180	170	147	123	107	86	50	32	17	19	12	20	0									
Eagle Bridge	239	236	217	205	227	200	190	167	143	127	106	70	52	37	31	23	0										
Troy	231	228	209	197	219	192	182	159	135	119	98	62	44	29	8	0											
Albany	215	212	193	181	203	176	166	143	119	102	81	45	27	36	0												
Schenectady	203	200	181	169	191	164	154	131	107	90	69	33	15	0													
Delanson	188	185	166	154	176	149	139	116	92	75	55	18	0														
Cobleskill	170	167	148	136	158	131	121	98	74	57	37	0															
Oneonta	134	131	112	100	122	95	84	61	38	21	0																
Sidney	113	110	91	79	101	73	63	40	17	0																	
Nineveh	96	93	74	62	84	57	47	24	0																		
Binghamton	120	117	98	86	108	81	23	0																			
Owego	143	140	121	109	131	104	0																				
Carbondale	39	36	17	5	27	0																					
Honesdale	66	63	44	32	0																						
Jermyn Tfr.	34	31	12	0																							
Scranton	22	19	0																								
Wilkes-Barre	10	0																									
Buttonwood	0																										

D. & H. connects at two or more points with the following:—

B. & M.	Troy, Mechanicville, Eagle Bridge
C. R. R. N. J.	Hudson, Wilkesbarre, So. Wilkesbarre
D. L. & W.	Binghamton, Scranton, Plymouth
Erie	Binghamton, Jefferson Jct., Carbondale, Winton Jct. Scranton, Pleasant Valley Jct., Honesdale
G. T.	Rouses Pt., Moores Jct.
G. & J.	Greenwich Jct., Johnsonville
L. V.	Owego, Avoca, Wilkesbarre, So. Wilkesbarre
N. Y. O. & W.	Sidney, Carbondale, Jermyn Transfer
N. Y. C.	Albany, Troy, Schenectady, So. Schenectady Voorheesville, Saranac Lake
N. Y. S. & W.	Minooka, Yatesville
P. R. R.	Buttonwood, So. Wilkesbarre
Rutland	Rouses Pt., Moores Jct., Ft. Ticonderoga, Rutland

Delaware & Hudson Mileage Table for Car Service Department

This is covered by separate instructions to each junction agent and, of course, is of no interest to other stations.

Combined Home Route Card and Empty-Car Waybill

The adoption by the American Railway Association (June 23) of the revised rules re-establishes the home route card, the use of which was suspended during the period of quasi-pooling which prevailed under war conditions; and the Delaware & Hudson is introducing a form (size 4 in. by 11 in., reduced in the illustration one-half in width and height) which contains both this and three empty-car waybills. The form is self-explanatory. Every foreign car received must be accompanied on its travels by a home route card as long as it is retained; and, as such a car may make a number of journeys, loaded or empty, before it is surrendered to the road whence it came (or to some other road) the three waybill forms printed on the single large card may often obviate the use of three separate cards. In the event car is

used for a new load, the card, serving as a home route card only, is attached to the new billing and accompanies it to its new destination, or to the junction point if car is destined to a point off the Delaware & Hudson. When the car is moved empty, one of the three waybill spaces is used. For example, a car received from the Erie at Binghamton and sent to Albany and there unloaded, may be wanted for a return load, not from Albany, but from Oneonta, which is between Albany and Binghamton. In that case, Albany uses the first of the waybill spaces (the upper one) to bill the car to Oneonta. If Oneonta should use it for a load, only part way back to Binghamton, the second waybill space would be available for the final journey empty (to Binghamton). Each waybill entry is obliterated after it has served its purpose. The card is of suitable size to go with the standard revenue waybills now in use. The lower section contains the names of the more important junction points with the initials of the connecting railroad at such junction points.

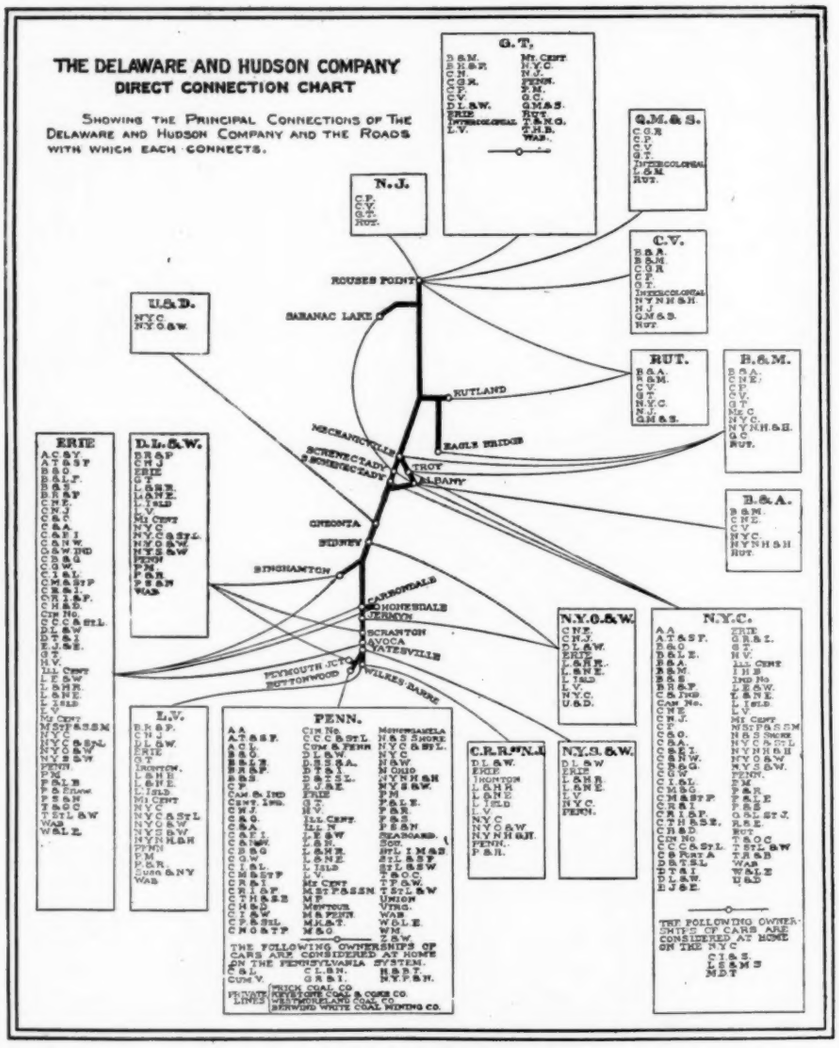
If a car is delivered to a connecting line, the card is kept on file at the delivering junction point and upon return of the car empty the card furnishes proper information for disposing of the car as well as the proper billing on which to move it.

In the lower section the junction points are arranged in the order of the volume of loaded cars received; ninety per cent of the loaded traffic of the Delaware & Hudson is received at the stations shown on the card. A larger road would, of course, have a relatively greater number of important junction points, but it would be practicable of course, to divide a railroad into zones and use two or even more forms of cards if necessary.

For these forms and illustrations we are indebted to J. E. Roberts, superintendent of transportation of the Delaware & Hudson, who also is chairman of the committee on car service of the transportation division of the American Railway Association.

The home route card is Form 889. Agents and yard-masters receiving foreign cars not accompanied by this form must request home route from superintendent of transportation advising original point received from, etc. Conductors must decline to handle a foreign car, either loaded or empty, unless accompanied by Form 889, properly filled out. When loaded on line, loading agent will be held responsible for cancelling that section used in forwarding car to his station, and conductors will decline to move loaded cars unless such cancellations have been made.

Circular No. 14 follows:



A Useful Aid to Yardmasters
(Chart 8½ x 11 inches)

COMBINATION HOME ROUTE CARD AND EMPTY CAR WAYBILL

CAR NO. _____

KIND OF CAR _____

PAT. APPLIED FOR Form 889

FILL OUT ONLY WHEN USED AS EMPTY CAR WAYBILL

EMPTY CAR WAYBILL

TO _____
ORDER _____ WT. FOR ENG. RATING _____
STATION FROM _____
AGENT OR Y. M. _____ DATE _____

TO _____
ORDER _____ WT. FOR ENG. RATING _____
STATION FROM _____
AGENT OR Y. M. _____ DATE _____

TO _____
ORDER _____ WT. FOR ENG. RATING _____
STATION FROM _____
AGENT OR Y. M. _____ DATE _____

THE DELAWARE AND HUDSON CO.
HOME ROUTE CARD

JUNCTION POINT	R. R. REC'D FROM	DATE
BINGHAMTON	ERIE	
	D L & W	
	L V	
WILKES BARRE	C R R N J	
	L V	
BUTTONWOOD	PENNA	
MECHANICVILLE	B & M	
ROUSES POINT	G T	
	RUT	
	C V	
	N J	
	Q M & S	
ALBANY	N Y C	
	B & A	
SCRANTON	ERIE	
	D L & W	
SCHENECTADY	N Y C	
TROY	N Y C	
CARBONDALE	ERIE	

STATION NOT NAMED WILL INSERT NAME OF JUNCTION POINT. R. R. RECD FROM AND DATE

Delaware & Hudson Combined Card
(4 in. x 11 in.)

Delaware and Hudson Circular No. 14

D. & H. CARS

RULE 1. D. & H. cars must not be used for the loading of traffic beyond the limits of The Delaware & Hudson Company when the use of other suitable cars under these rules is practicable.

D. & H. coal cars may be loaded off line only to destinations in New Jersey, New York, New England, and Canada via Rouses Point, and with iron ore and pig iron to destinations in State of Pennsylvania via Wilkes-Barre and Buttonwood. Unless otherwise instructed surplus empty D. & H. coal cars will be billed to Carbondale.

FOREIGN CARS

Foreign cars received under load may be forwarded to destination; when original lading is removed or when received empty they must be handled as provided in Rules 2 and 3.

FOREIGN CARS AT HOME ON DIRECT CONNECTIONS OF D. & H.

RULE 2. (a) May be loaded in local service in the direction of the home road, or
(b) Loaded (via any route) so that the home road will participate in the freight rate, or moved
(c) Loaded or empty in any direction to a local point, or delivered to a short line or switching railroad, if to be loaded for delivery on or via the home road, or
(d) Delivered empty to road from which originally received under load, if such road is also a direct connection of the home road, or
(e) Returned empty to the delivering road when handled in switching service and owner is not a direct connection in that switching territory, or
(f) Delivered empty to home road at any junction point.

FOREIGN CARS AT HOME ON OTHER THAN DIRECT CONNECTIONS OF D. & H.

RULE 3. (a) May be loaded locally in the direction of the home road, or
(b) Loaded (via any route) to any road in the direction of the home road, or
(c) Loaded (via any route) so that the home road will participate in the freight rate, or moved
(d) Loaded or empty in any direction to a local point, or delivered to a short line or a switching railroad, if to be loaded for delivery on or movement via the home road, or to a point in the direction of home road beyond Delaware & Hudson Rails, or moved
(e) Empty to road from which originally received at junction where received, if impracticable to load in accordance with this rule.

DISPOSAL OF SURPLUS EMPTY CARS

RULE 4. The use of the home route card is re-established and the information shown thereon will be used as the basis for disposing of empty cars under sections (d) and (e) of Rule 2, and section (e) of Rule 3.

Special care must be taken to dispose of cars owned by our direct connections via shortest route. In disposing of such cars, it is permissible to deliver to road from which received at the junction point where received, or at a junction nearer home road, when empty mileage can be saved for both roads.

Example: D. L. & W. car at Saratoga originally received from N. Y. C. at Saranac Lake may be delivered N. Y. C. at Schenectady.

Cars owned by our direct connections when received from other than owners may be returned to the road from which received only when such road is also a direct connection of car owner.

Yardmasters after filling daily billing orders will dispose of surplus empty foreign cars in accordance with these rules, reporting surplus empty D. & H. (except coal cars) for disposition.

Local Agents will report on daily telegraph report, all surplus empty cars for disposition (except D. & H. and foreign coal cars) which should be disposed of in accordance with these rules.

PRIVATE LINE CARS

RULE 5. Unless otherwise instructed the return movement of empty private line cars will be over the same road and through the same junction points as the outbound loaded movement as indicated by the information shown on the home route card.

TANK CARS

RULE 6. When tank cars are unloaded the owners or party to whom consigned will issue instructions for empty movement to the Agent at point of unloading. The Agent will bill each car to final destination, without revenue, but using standard form of revenue way-bill showing name of consignee and full route.

GENERAL INSTRUCTIONS

Agent will require shippers to furnish destination and routing of shipments when ordering cars for loading. If proper car is not available for loading offered, same will be ordered in usual manner. When ordering cars, Agents must give commodity to be loaded, destination and full routing. Agent must immediately notify shippers of change in Car Service Rules, furnishing them copies if desired, and notifying them that no cars may be loaded except as authorized herein. Cars loaded by shippers without authority and in violation of these rules must be transferred into proper cars by shippers at their expense, and demurrage charges assessed against cars improperly loaded, until release, as per published demurrage tariff. See chart for the principal connections of the D. & H. Co. and the roads with which each connects.

[The following appears on the front page in red ink.]

THE RATE FOR THE USE OF FOREIGN FREIGHT CARS IS NOW ONE DOLLAR PER DAY.

Illinois Central Makes Claim Prevention Appeal to Shippers

On July 1, the Illinois Central, through its president, C. H. Markham, issued an appeal to shippers and consignees through advertisements in the press, to aid the road in its "claim prevention" campaign. The advertisement read in part:

During May, 1921, 68 per cent of the amount paid out for loss and damage to freight on the Illinois Central System was on carload shipments. We request carload shippers to insist upon being provided with cars suitable for the particular kind of freight they desire to ship and to see that shipments are properly braced and stowed in cars to prevent damage by shifting.

We request shippers of less-than-carload freight to comply with the rules and specifications of the Consolidated Classification Committee appointed by the Interstate Commerce Commission by selecting substantial containers in which to pack their goods for shipment, so that packages may not be crushed and contents damaged when loaded into cars with other freight. We request them to mark their packages plainly as to name of consignee and destination, removing all old marks that may appear on packages, and to furnish legible billing orders, so that billing may indicate clearly the name of consignee and destination. We also request them to deliver their goods at freight depots early in the day to avoid hurried loading and billing.

We request receivers of freight to observe the character of containers used by shippers and the manner in which goods are packed, crated and marked, particularly when goods are not received in good order, and to make those facts known to the shippers, appealing to them to use good containers, on the ground that defective goods and delayed transportation service cause them loss of trade. We also request receivers of freight to notify our representatives promptly of any concealed loss or damage to their shipments, in order that immediate investigation may be made. Some receivers of freight neglect to do this for days, and even weeks, after shipments have been received, rendering it difficult for the proper inspection and investigation to be made. This militates against good service.

Our purpose in presenting this problem to our patrons is to enable us to render a better service by eliminating delay in the delivery of freight in good condition and to assist in reducing the cost of transportation. By no means do we claim that all of the trouble is due to lack of care on the part of shippers and consignees. We are doing everything within our power to correct abuses for which we are responsible. We are putting forth our best efforts to render a service of satisfaction. By working closely with shippers and receivers of freight, we believe it possible to bring the troublesome question of loss and damage under control, to the great advantage of shippers and receivers of freight, as well as to this railroad.

Freight Car Loading

WASHINGTON, D. C.

A REDUCTION of 5,680 cars, compared with the previous week, in the number of cars loaded with revenue freight during the week ended on June 25 is shown by the weekly report of the Car Service Division of the American Railway Association. The total for the week was 775,061 cars which was a decrease of 136,442 as compared with the corresponding week in 1920 and 70,623 below the total for the corresponding week in 1919. Comparisons with the previous week show reductions in the loading of all commodities with the exception of ore.

The largest increase compared with the week which ended on June 18, was in the loading of grain and grain products, the total for the week being 38,821 cars or 2,173 cars less than the preceding week. Loading of merchandise and miscellaneous freight, which includes manufactured products, amounted to 468,107 cars, which was 1,416 cars under that for the week before. A decrease of 1,045 cars was reported for forest products, bringing the total for the week to 49,427 cars. Only a slight increase was reported in the number of cars loaded with coal, the total for the week being 156,999 or 244 more than the week before. This was, however, 38,500 cars less than were loaded during the corresponding week in 1920 and 30,159 under the total for the corresponding week in 1919. Loading of livestock totaled 28,229 or a decrease of 312 cars compared with the preceding week and coke 4,557 or a decrease of 545 cars compared with the same period. Reports showed 28,921 cars loaded with ore which was an increase of 55 cars over the previous week. With the exception of grain and grain products, reductions in the loading of all commodities compared with the corresponding week last year were shown.

Compared by districts, the Pocahontas, Southern and Central Western were the only districts to report increases in the number of cars loaded with revenue freight over the week. With the exception of grain and grain products, reduc- all were under the corresponding week last year.

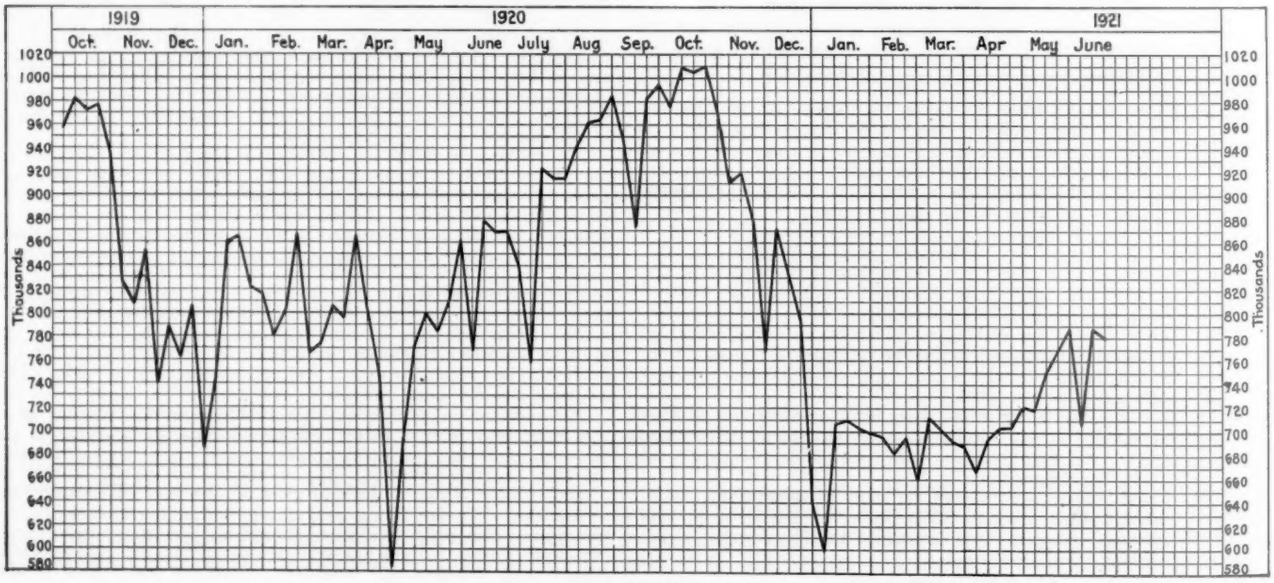
The loading report for the week of July 18 is as follows:

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS.

Summary—All Districts, Comparison of Totals This Year, Last Year, Two Years Ago. For Week Ended Saturday, June 18, 1921.

Districts	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Mdse. L.C.L.	Miscellaneous	Total revenue—Freight loaded: This year 1921	Corresponding year 1920	Corresponding year 1919	Received from connections: This year 1921	Corresponding year 1920	Corresponding year 1919
Eastern	1921	6,450	3,212	42,592	949	5,406	1,807	56,920	72,095	189,441	.....	.....	194,128	.....	.....
	1920	6,176	2,955	52,122	2,697	8,362	7,897	25,334	111,886	.....	217,429	206,202	.....	247,215	220,097
Allegheny	1921	3,310	3,149	48,920	2,201	3,076	6,587	44,393	52,792	164,428	.....	.....	114,336	.....	.....
	1920	2,385	3,240	56,016	5,201	3,815	10,236	42,225	72,884	.....	196,502	159,735	.....	151,261	114,495
Pocahontas	1921	191	147	24,292	20	1,342	24	2,713	5,226	33,955	.....	.....	14,259	.....	.....
	1920	121	104	20,710	582	2,048	247	197	9,830	.....	33,839	32,216	.....	22,566	16,472
Southern	1921	3,243	2,014	19,632	442	14,898	795	37,966	32,172	111,162	.....	.....	61,292	.....	.....
	1920	2,937	2,242	24,233	197	16,555	3,289	25,762	49,776	.....	124,991	111,423	.....	77,011	59,344
Northwestern	1921	11,263	8,078	4,885	625	15,076	18,383	27,257	32,743	118,310	.....	.....	42,555	.....	.....
	1920	9,867	7,632	8,151	1,332	17,463	44,173	23,131	44,024	.....	155,773	146,132	.....	58,075	51,115
Central Western	1921	11,411	9,775	12,799	138	5,119	543	30,713	34,995	105,493	.....	.....	48,325	.....	.....
	1920	9,011	11,009	21,913	406	6,373	4,798	31,714	42,357	.....	127,581	102,394	.....	71,274	67,541
Southwestern	1921	5,116	2,166	4,123	727	5,555	727	15,660	23,878	57,952	.....	.....	39,463	.....	.....
	1920	3,928	2,658	5,693	926	6,022	734	16,330	24,330	.....	60,621	49,805	.....	48,041	45,831
Total all roads	1921	40,994	28,541	157,243	5,102	50,472	28,866	215,622	253,901	780,741	.....	.....	514,358	.....	.....
	1920	34,425	29,840	188,838	11,841	60,638	71,374	164,693	355,087	.....	916,736	.....	.....	675,443	.....
	1919	30,044	27,582	172,217	....	61,971	63,608	.....	452,485	.....	.....	807,907	.....	.....	574,895
Increase compared	1920	6,569	....	....	....	....	....	50,929	.....	.....	.....	.....	.....	.....	.....
Decrease compared	1920	....	1,299	31,595	6,739	10,166	42,508	.....	101,186	135,995	.....	.....	161,085	.....	.....
Increase compared	1919	10,950	959	....	5,102	....	....	215,622	.....	.....	.....	.....	.....	.....	.....
Decrease compared	1919	....	....	14,974	....	11,499	34,742	.....	198,584	27,166	.....	.....	60,537	.....	.....
June 11	1921	41,119	29,135	163,088	4,788	51,393	30,179	215,740	253,555	788,997	930,976	807,205	509,129	681,514	563,838
June 4	1921	41,394	24,039	142,674	4,642	48,227	28,311	195,246	221,975	706,508	828,907	776,610	480,162	657,709	524,731
May 28	1921	46,337	27,518	164,870	5,605	50,277	28,673	215,095	248,862	790,849	898,169	763,761	519,191	670,536	550,858
May 21	1921	37,252	26,368	158,512	5,337	50,216	30,214	216,030	244,401	768,330	862,074	777,324	508,969	666,585	557,879

L.C.L. Merchandise loading figures for 1921 and 1920 are not comparable as some roads are not able to separate their L.C.L. freight and miscellaneous of 1920. Add merchandise and miscellaneous columns to get a fair comparison.



Curve of Revenue Car Loading

Week ending June 25 not plotted, 775,061.
Week ending June 18, 1921, 780,747.

Week ending June 18, 1920, 916,736.
Week ending June 18, 1919, 807,907.

The number of surplus freight cars continued to decline during the period from June 15 to June 23. The average was 377,850 cars in excess of current freight requirements or a reduction of 3,896 cars as compared with the total on June 15. Surplus box cars totaled 140,627 or a decrease of 3,308 in approximately a week while surplus coal cars numbered 163,982. The latter figure is an increase of approximately 4,500 over that reported for June 15 but this is due principally to a correction that had to be made in the earlier figures resulting from a mistake made by one of the large carriers in its report. Reports also showed an increased demand for other classes of freight cars. From June 15 to June 23, surplus automobile and furniture cars declined approximately 460, flat cars 388 and stock cars 1,140.

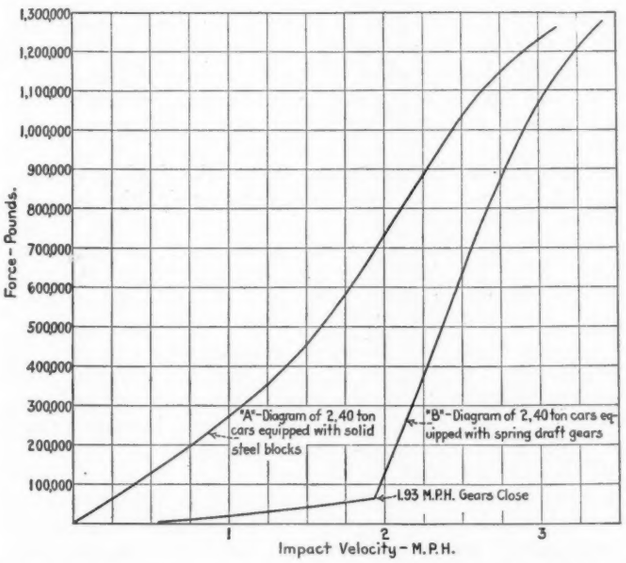
Impact and Its Relation to Damage Claims*

Two Miles an Hour the Maximum Speed for Coupling if Evils of Rough Handling Are to Be Avoided

By J. A. Pilcher
Mechanical Engineer, Norfolk & Western

THE REDUCTION of operating expenses, necessary to the very existence of railroads in this country, is the greatest problem confronting operating officers at the present time. Among the many items which make up the volume of operating expenses is damage to freight equipment and lading in transit.

Damage claims chargeable to rough handling and unlocated damage arising from movement of freight traffic present a serious financial drain. Campaigns to educate employees through picture lectures and periodic meetings have been instituted on many roads to illustrate more forcibly the de-



Relation Between the Speed at Which Cars Are Coupled and the Force of Impact

struction of freight equipment and lading caused by careless shifting and handling of trains, improper warehouse trucking of freight and indifferent stowing of merchandise in cars.

The term rough handling does not always convey the same meaning to everyone and a definition may not be out of place. In the first place, it does not mean the rapid moving of either car or package, after it has once been set in motion. But it does mean a rapid rate of change in the speed of movement, as when a package, dropped from a high building, strikes the pavement and comes to a sudden stop, or when the fast moving train strikes a standing train or some other obstruction.

A package dropped from a high building is not hurt in starting, though the package and every part of it increases its speed at the rate of 32.2 ft. per second and has a force constantly pressing against it equal to the weight of the package. This is nearly 22 miles an hour. Inversely, it is also true that if the package or a car or train moving at a speed of about 22 miles an hour, had a constant force applied to it to stop it equal to its own weight, it would come to a standstill in one second and in a distance of 16.1 ft. and with no more damage to it than to the package in starting the fall, provided it were possible to apply the force uniformly to every particle of the package, car or train, and its contents at the same time.

If the package weighs only one pound and is packed in any kind of shape, a force of one pound on any part of it is not likely to do harm. If the package weighs 1,000 lb. and we desire to set it in motion, we must be more particular where we apply the force and be sure it is not concentrated on some weak spot or some very limited area of the surface. Exactly the same law applies to stopping the movement of the package after it has been set in motion. If a package made of strawboard or other light material for holding light or fragile commodities, be stored between the end of a car and heavier goods in a strong box, or between two such boxes, it will suffer if the car receives even reasonable service. If it is stored under such heavy boxes it is, of course, crushed by their weight. Such packages, therefore, should be stored on top of the heavy freight when not stored in cars by themselves.

If we start or stop cars weighing 130,000 lb. to 300,000 lb. it is necessary to take hold of them at some point of the structure designed to resist a force of 130,000 lb. to 300,000 lb. if they are not to break or crush. Likewise, the package or the car must be strong enough to transfer the force from the point at which it is applied to every other particle of itself and its contents. It would not be wrong at all to stop one car weighing as much as 300,000 lb. traveling at a speed of 22 miles per hour in one second and in a distance of 16.1 ft., by applying a retarding force of 300,000 lb., on the end of the coupler in a proper contact, but it would be out of all question to apply to this one coupler a sufficient force to bring to a stop a train of such cars under the same conditions.

In the stopping of trains with the brakes, the necessity for any such attempt is done away with by the application of the retarding force to many points along the whole train, thus distributing the great total force. The brakes on the freight cars are proportioned in such a way that under no

*Prepared for the Freight Claim Prevention Committee of the Freight Claim Division, American Railway Association.

condition can the retarding force exceed about one-quarter of the weight of the light car. Under this condition, if traveling at a speed of 22 miles per hour it could not be stopped by the brake in less than four seconds or in a distance less than 64.4 ft. In the case of trains of loaded cars the retarding force from the brake, compared to the weight of the car and contents, is very much less, in many cases not as much as one-twentieth of the weight of the car. If the force is one-twentieth the weight of the car it will come to a standstill from a speed of 22 miles per hour in 20 seconds or in a distance of 322 ft. Such forces as have just been discussed, even up to the weight of the package, if uniformly and evenly applied, do no damage.

Rough handling, therefore, is either too rapidly starting or stopping the movement of the package, car, or train, or applying the necessary forces for stopping or starting on much too small a portion of the package, car or train. Ramming a truck into a box of goods to slightly alter its position does local damage to the package and contents, and, so far as the results to this particular package are concerned, it is just as much rough handling as running a switch engine into a train of box cars standing at a freight station.

The general rule for moving cars in all cases is "do not start or stop too quickly" and for moving packages in the freight house the same rule applies, with the additional caution to "be careful where and on what amount of surface the force is applied."

In moving packages there is little danger from local application of the force unless the package is rammed with the truck to produce a small movement, but the warning against stopping too quickly is very necessary, as packages of all kinds stop very quickly when dropped on the floor or on each other. Personal experience with package handling soon teaches the conscientious man, as he so often sees the results of ramming and dropping, and no further reference will be made to them. But car handling, probably the most prolific cause of unlocated damage, will be considered further for the reason that the damage is largely hidden and thus leaves the party causing the damage without the much needed experience, be he ever so conscientious.

Impact Between Cars

No car should strike another at a speed greater than two miles an hour. This speed brings a force of about 125,000 lb. between the couplings of cars weighing about 130,000 lb. and brings the twin spring draft gear solid. Any striking speed above this rapidly increases the forces of reaction.

No locomotive weighing with tender as much as 130,000 lb. should have the tender end with the draft gear connection rammed into a car at a speed greater than two miles an hour. When the front end of the locomotive is used the speed should be brought down to about one and one-third miles an hour, as only the car draft gear comes into action. When a larger locomotive is used, the striking speed should be still further reduced in proportion to the weight of the locomotive.

In starting a train, if the locomotive is traveling at a speed greater than two miles an hour when the rear end is jerked into motion, the condition is the same as far as the results are concerned as if one of the cars had been rammed into the other at that speed. While the train is in motion all conditions that will bring about a difference in speed of two adjacent parts of over two miles an hour should be avoided. If there were no unrestricted slack in the train when the train is passing through dips and over humps the variations in speeds of adjacent cars could not become of any serious importance. If the brakes could be applied to each car simultaneously and in equal proportions no marked difference in speed could be developed. Unrestricted slack between cars cannot be entirely eliminated. Up to the present time no brake is in use that does not have a time element between the application of the brakes on the adjacent cars. Owing to changes in loading and variations in piston travel the brakes are not always proportionately the same. Care must be exercised in bringing the train through dips and over humps. Maintaining a constant speed of the engine is a great help in this respect. In the application of the brakes a heavy application at slow speeds is the one most liable to give trouble. This may bring the front part of the train to a dead stop before the brakes have applied on the rear portion. This is the same as running into a standing car.

A series of impact tests were made at Rochester, N. Y., using cars fitted with various kinds of draft gears and with no draft gears. Recording instruments were used which showed the instantaneous speeds and recorded the time down to one-thousandth of a second. From this accurate record of the speed of movement of the struck and striking cars, the forces of reaction between the parts of the cars in contact were determined during each moment of contact. The diagram *A* is a record of the impact between two loaded cars, weighing 132,000 lb. each, without any draft gears, and shows the striking speed in miles per hour, plotted against the forces in pounds. It will be noted on this diagram that striking at a little more than one-half mile an hour brings the forces of reaction at the points of contact up to the weight of the car. Striking at one mile an hour brings the forces up to about 270,000 lb.; one and one-half miles an hour, up to about 455,000 lb., and if the striking is done at two miles an hour the forces will be 730,000 lb., provided the car is not already over-strained and giving way under the forces thus developed.

Diagram *B* shows the forces when two loaded 40-ton cars weighing 132,000 lb. each and fitted with tandem spring draft gears, are run together. This type of car with the tandem spring draft gear is selected because so many box cars of this capacity and so equipped are in use and in them is hauled the larger portion of the box freight of the country. If striking speeds are reduced to take care of these cars, more modern cars with better draft gears will be properly protected.

It will be noted on diagram *B* that the draft gear goes solid at 1.93 miles an hour and at this point the force of reaction between the cars is only about one-half the weight of the car, or 62,000 lb., a very small force for the car to stand. After the draft gear goes solid the forces between the cars rise very rapidly with the increase in the striking speed. Even at as low a striking speed as two miles an hour, an increase of only 0.7 miles an hour, the forces of reaction have increased to 125,000 lb. At a striking speed of 2.25 miles an hour the forces of reaction have increased to about 375,000 lb. Another 0.25 mile an hour speed increase brings the forces of reaction up to about 635,000 lb.

If these forces acted on the units in the car the same as the force of gravity acts in the case of a falling body, viz., if every particle received just the force necessary to retard it, results would not be so serious as the records show. The fact is that speeding up or slowing down of movement in a horizontal plane has to be brought about by some external force, applied against some particular portion of the car, viz., between the wheels and rails with brake application and at the coupler when the cars come together. Each package or unit of freight in the car has also to be acted on from without itself either to be accelerated or retarded in its motion. Some of the packages are in contact with the ends of the car. If they are heavy and the friction on the bottom of the car or of the parts on one another is not great enough, the ends of the car are knocked out, as when lumber comes through the end of a car. If one package has to take the force of the one next to it, it is simply a question of the relative values of the strength and force as to whether or not it will be crushed.

The character of the package also has much to do with the liability to damage under the forces of the impact. A crate of eggs with proper strips between the eggs does not need the care in handling that would be necessary with a box full of eggs with no strips between them; neither does a basket of eggs require as careful handling as a box of eggs. The basket, being less rigid and the parts of the basket itself being readily subject to changes in shape from small forces, allows the eggs some movement after the basket has reached the floor and so does not bring them to so sudden a stop as would the box. The crate with the resilient or spongy pasteboard partitions between the eggs allows a comparatively large amount of movement of the eggs and so does not need the care in handling of either the basket or the box.

This illustrates the necessity for holding striking speeds down to the point where no draft gear in common use goes solid if rough handling damage to freight is to be held down to a reasonable minimum. It also illustrates the fact that the reaction forces of impact increase very rapidly after the draft gears go solid and, further, that a very small increase in striking speed above that necessary to bring the draft gears solid brings into action a force that will damage any reasonable structure.

The question can very naturally be asked, "If such a statement is true, why do we not see more damage?" Reported rough handling damage added to the hidden and unaccounted damage to freight, called "unlocated damage" is now certainly more than enough. The cost of freight car repairs is another item that shows more than enough. Furthermore, the damage to equipment, by absorbing the force of the impact, often protects the lading.

Damage to Equipment

The damage to equipment is not always immediately apparent to the eye. A car, unlike a glass tumbler or an egg, does not fall to pieces as soon as it is struck too hard. It is a structure that has more or less resilience in itself and the parts will go through a very considerable amount of deformation before they break. This deformation of parts is not apparent to the brakeman who allows the cars to go together or to the engineman who allows the engine to go against the cars too hard. The damage has been done nevertheless and shows up at some future time when there is seemingly no reason. A stone mason breaking a rock with his hammer does not accomplish his purpose with a single blow. He strikes a large number of blows and finally the rock cracks open. Can you say which blow broke the rock? Did the last blow have any more to do with it than the first? The last blow was probably not as hard as the first, since the striking arm grows tired. Just in this way does every over speed coupling of cars do its damage, which finally shows up in the car repairs.

Prevention

The great question is how are we going to bring the damage from rough handling down to a reasonable minimum? The answer is to educate the men doing the handling as to the significance of impact at over-speeds and further educate them so they can judge the slow speeds at which the equipment should be brought together. Two miles an hour is a rail length in about 11 seconds, a very slow walking speed for a man. Three miles an hour is an ordinary walking speed for a man, and four miles an hour is a very fast walking speed for a man. Remember that no striking or contact speed should be above two miles an hour.

Would it pay to have trained observers constantly on the alert that they might keep the car handlers trained in the matter of speeds and the effect of over-speed impact? There are certainly great possibilities for saving by employing such a supervisory force.

Such training would also put an end to the constant call for stronger cars from year to year. The energy of moving masses is as the square of the speed, so the strength has to be increased much faster than the speed or the damage will be much greater in proportion than the increase in speed.

The increased cost of car repairs is just as much or more a question of the method and care of handling as it is a question of design of equipment and efficiency of the repair department. Comparison can be made of the cost of repairs per car mile as between one road and another, but if a comparison is not also made of the method and care of handling, it has little real value. The man having responsibility for the repairs has nothing to do with the handling and no chance to reduce the over-speed impact. The man who is responsible for the handling is also responsible for the cost of handling and has constantly before him the incentive to handling cost reduction. He should remember that the men who repair the bad order cars do not put the cars in bad order and that the cost of repairs to bad order cars on the mileage basis depends much more on the number of cars damaged and the amount of the damage, than on any possible difference in the methods of handling the repair department.

Those responsible for the cost of handling the equipment very naturally say they cannot handle at a speed of not over two miles an hour and keep handling expense at a reasonably low point. They must not forget that the handling speed and the over-speed at the instant of impact are entirely separate matters. The question is, how much extra will the railway company have to pay for the reduction of over-speed impact and will this extra payment save as much or ten times more in freight claims and cost of repairs to equipment? It must not be forgotten here that only a small portion of the over-speed impact damage is apparent at the time of impact, only those cases that are very flagrant digressions from proper methods showing up immediately.

Over-speed impact can only be gotten rid of by the conscientious painstaking effort of those handling the equipment. They must learn how they can give quick handling with low impact speeds of not over two miles an hour. They must inform themselves of the consequences of over-speed impact and train themselves to estimate the slow speeds correctly. Those who supervise in this work must give particular study to the consequences of over-speed impact and give themselves particular training in judging slow speeds so they can intelligently instruct and correct those who actually handle the cars and locomotives.

The supervising forces will have to be at this instructing and correcting day in and day out, year after year, even more strenuously than they are after the speeding up of the movement and keeping down of the handling cost. They must remember that the direct handling cost is easily shown on paper, but the indirect handling costs can be much greater, and that while these indirect costs are accounted for by another department, their influence on the net earnings of the railroads is no less marked for that reason.

They must remember also that while it may save the car, the designing of stronger cars does not save the lading. Furthermore, stronger cars mean heavier cars. Heavier cars cost more in the first place, their earning capacity for a given axle loading is reduced, and hauling around the extra dead load causes a direct increase in operating expenses.

THE MERCHANTS' ASSOCIATION, of New York City, through its traffic bureau, is agitating the plea, said to be in the minds of many thousands of traveling salesmen, for a resumption of the general sale of mileage books—3,000 miles or 5,000 miles—for travel on all railroads at a rate lower than the regular one-way fare. The statement of the Merchants' Association says that the National Council of Traveling Salesmen's Associations has appointed a committee to present this matter to the railroads and to the Interstate Commerce Commission.

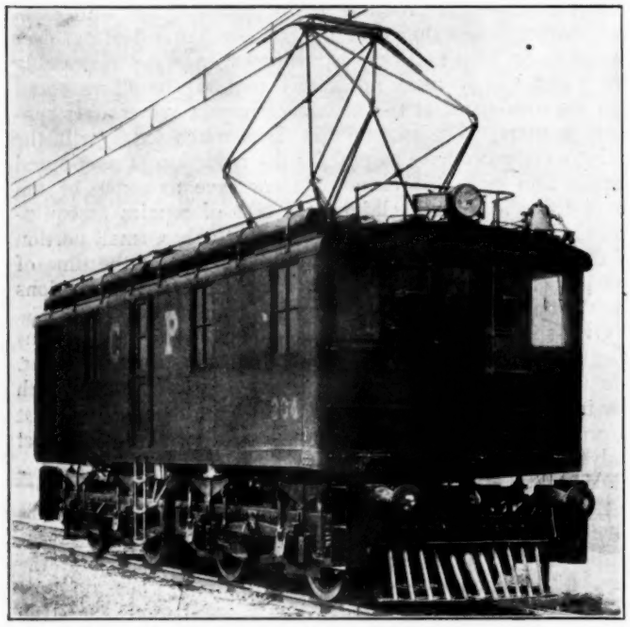
Electrification of the Paulista Railway of Brazil

Fuel Scarcity Forces the Adoption of Electric Motive Power on Brazilian Wide Gage Line

By W. D. Bearce
Railway and Traction Engineering Dept. General Electric Co.

THE concluding shipments are being made on the $2,000,000 contract with the International General Electric Company for the electrification of a section of the Paulista Railway in Brazil. This project includes a double track section 28 miles in length between Jundiahy and Campinas.

The motive power equipment consists of eight freight locomotives weighing 100 tons each and four passenger locomotives weighing 120 tons each. Work has been



Freight Locomotive for the Paulista Railway

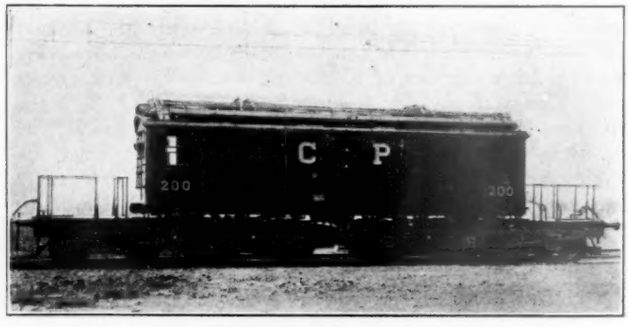
progressing on these locomotives for about a year at the Erie works and the first locomotive was put on the test track about the middle of March. Complete running tests were made and two freight locomotives were shipped before the middle of May. One of the passenger locomotives was also put on the test track and shipment was made, according to schedule, during May.

In addition to the locomotives, the contract included the equipment of a complete 3,000-volt direct current substation of 4,500 kw. capacity consisting of three 1,500 kw. 3 unit motor generator sets, transformers, switches and high tension equipment. Overhead line material has also been furnished for 76 miles of track and material for 10 miles of 88,000 volt, 3 phase, 60 cycle high tension transmission in duplicate from the lines of the Sao Paulo Light & Power Company.

The line from Campinas to Jundiahy is a main line section connecting at the southern terminus with the Sao Paulo Railway and the Central Railway of Brazil. The Central Railway is government owned and electrification of this line has also been authorized. At Campinas and other points north connection is made by the Paulista Railway with a number of feeder lines, which bring large quantities of coffee and other raw material from the interior.

The road bed is rock ballasted and the construction throughout is equal to any of the main line roads in the United States. The track gage is 5 ft. 3 in. on the section to be electrified, but some of the connecting lines are narrow gage and facilities are provided for transferring the car bodies complete with merchandise to narrow gage trucks and vice versa. The passenger service includes high speed passenger trains with full Pullman accommodations. The present locomotive equipment consists of heavy type locomotives for freight service with high speed engines for passenger service. All are equipped for burning wood as fuel instead of coal. On account of the high price of coal and the great difficulty in securing it, wood is burned almost exclusively in this part of South America. The variety most used is known as quebracho, which gives satisfactory results except that, of course, the quantity required for a 100-mile run is very bulky. Recently there has been difficulty in procuring even wood that is suitable for this work Electrification, therefore, was decided upon as the remedy.

The section selected for electrification presents a rather difficult profile including maximum grades of 1.5 to 1.8 per cent. While the immediate plans of the Paulista company contemplate electrification for only a distance of 73 miles, the design and capacity of all apparatus and equipment is suitable for operating on an extension to Sao Carlos a total distance of 129 miles. The approximate tonnage handled over this line during the year 1918 from Jundiahy to Cordeiro was about 275,000,000 ton-miles, including freight, passenger and non-revenue service. The electrical equip-



120-Ton 3,000-Volt Passenger Locomotive

ment is designed for handling approximately double this amount and the sub-station and line equipment is also capable of handling approximately double the 1918 revenue tonnage. As a basis for estimates it was assumed that the number of trains per day over the initial electric zone will be 6 passenger and 21 freight in each direction, making a total of 54 trains per day.

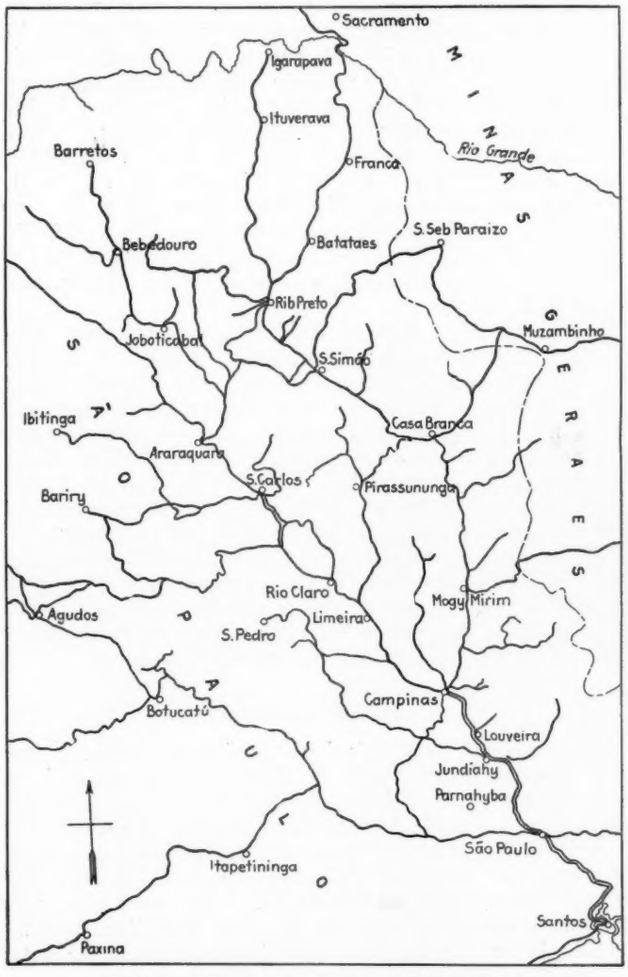
Locomotives

The initial order for locomotives included eight freight and four passenger all of the twin geared type. These are similar to those in successful use in United States on the Chicago, Milwaukee & St. Paul, the Butte, Anaconda & Pacific, the Detroit River Tunnel and other roads, and

include the well tried features of the best types of locomotives now in service.

Freight Locomotives.—The freight locomotives weigh 100 tons, all weight on driving axles. They are designed for handling a trailing train of 770 tons on the maximum 1.8 per cent grade at speeds of from 12 to 16 miles per hour. The maximum allowable speed on tangent level track is 30 to 35 miles per hour. It is expected that because of the greater capacity and higher speed characteristics the electric locomotives will provide an appreciable improvement in the existing steam service, both as regards schedule speed and weight of trains handled.

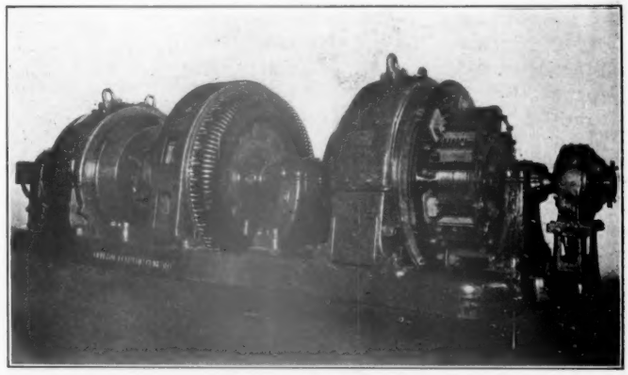
As shown in the photograph the freight locomotive has a running gear consisting of two 2-axle trucks coupled together by an articulated joint, and a single cab of the box type. The draft gear is mounted on the trucks and, all hauling and buffing stresses are transmitted through the truck frames and articulated joint, thus eliminating any possibility of damage to the cab and platform structure. Each truck is equipped with two GE-267 motors of the box frame type geared to the driving axle by two sets of gearing, one at each end of the motor. One of the trucks is side equalized and the other cross equalized, thus providing the equivalent of a three point support for the superstructure. The diameter of the driving wheels is 42 inches and of the cast wheel center 36 in. allowing for a steel tire 3 in. in thickness. The overall length of the locomotive is 39 ft. 2 in. and the rigid wheel base 8 ft. 8 in. The interior of the cab is divided into three compartments by partitions or bulk heads so placed as to form two end compartments about 5 ft. in length for the operator's cabs and the remainder for housing the control equipment, compressor-exhauster set and other auxiliary apparatus. Two pantograph trolleys are of the double pan sliding type similar to that used on other heavy electrification projects and are mounted on the cab roof. These are insulated for 3,000 volts and are designed to operate through a range of from 15 to 22 ft. above the rail.



Paulista Railway System and Connections

To conform to the equipment on this road it is necessary to provide control for the vacuum type brakes used on the cars. Two entirely different systems of brakes are therefore provided for; a straight air brake system for the locomotive, and vacuum type brakes on the train. The two systems are manipulated in the same manner as the usual all compressed air type, the locomotive brakes being applied automatically at the same time as the train brakes under normal running. Brakes can be applied on the locomotive alone or on the train alone if desired. When regenerating, however, there is a magnet valve so arranged that straight air cannot be applied while returning power to the trolley. However, should an emergency application be made, regeneration is discontinued and the brakes are applied on the locomotive.

Passenger Locomotives.—The passenger locomotives are similar in design to the freight units except that a two



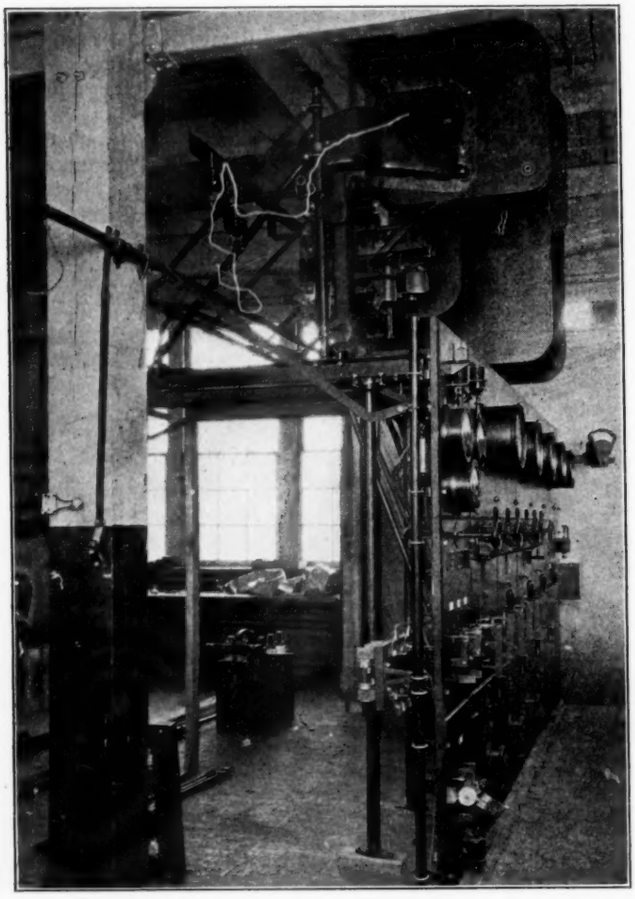
Three Unit Four Bearing 1,500 Kw. 3,000-volt D. C. Motor Generator Set for the Paulista Railway

axle guiding truck is provided at each end to comply with the railway company's specifications for high speed service. The motors used are identical to those on the freight locomotive except for the change in gear ratio to provide for maximum speeds of from 56 to 62 miles per hour. The running gear consists of two 2-axle driving trucks the inner ends of which are connected by an articulated joint. The outer ends are extended and supported on the guiding trucks by roller centering devices over the front axle and an articulate joint over the rear axle which also connects the guiding and motor trucks. The general arrangement of motors and control is the same as that on the freight locomotives, and a similar system of regenerative braking is also provided. This locomotive is designed for hauling a train of 440 tons trailing up a one per cent grade at a speed of 38.8 miles per hour. The gear ratio on the passenger locomotive is 70 to 30 or 2.33.

Regenerative braking is accomplished by connecting one motor in such a way that it excites the field of three other motors and also its own field. This scheme is in general similar to that used on the Chicago, Milwaukee & St. Paul gearless passenger locomotives and eliminates the necessity for a separate motor generator set for excitation. A balancing resistance is connected in the circuit to protect the motors against sudden surges of the line voltage and to give effective protection against line voltage changes. In order to

begin regeneration, the main controller handle is turned to the first notch series position and the selective handle to the braking position. The main handle is then notched up until the desired braking effect is obtained.

A high speed circuit breaker is placed between the 3,000 volt trolley and the locomotive apparatus. The duty of this breaker is to protect the motors and equipment from any injury due to short circuits or overloads. In case of a short circuit this breaker cuts in a protective resistance and then opens the line contactor. The action is very rapid so that in case of heavy overload, or short circuit, the possibility of damage is reduced to minimum. Breakers of a similar type



3,000-volt D. C. Generator and Feeder Railway Switchboard

are in operation in many parts of the United States both on locomotives and in sub-stations.

The following table gives the dimension, capacity and weights of the two locomotives:

DATA ON ELECTRIC LOCOMOTIVES FOR PAULISTA RAILWAY

	Freight	Passenger
Length overall	39 ft. 2 in.	55 ft.
Width	10 ft. 1¼ in.	10 ft. 1¼ in.
Height over trolley down	14 ft. 3 in.	14 ft. 3 in.
Total wheel base	26 ft. 8 in.	46 ft. 0 in.
Rigid wheel base	8 ft. 8 in.	7 ft. 9 in.
Total weight	200,000 lb.	240,000 lb.
Weight on drivers	200,000 lb.	160,000 lb.
Weight per driving axle	50,000 lb.	40,000 lb.
Weight per guiding axle	None	20,000 lb.
Weight of mechanical equipment	115,400 lb.	155,400 lb.
Weight of electrical equipment	84,600 lb.	84,600 lb.
Diameter of drivers	42 in.	42 in.
Diameter of guiding wheel	.....	36 in.
Number motors	4	4
Gear ratio	82/18	70/30
Total continuous rating hp	1,600	1,600
Total (1 hour rating) hp	1,680	1,680
Tractive effort cont.	28,820 lb.	14,720 lb.
Tractive effort 1 hr.	30,600 lb.	15,680 lb.
Speed continuous rating m.p.h.	21 (34 km.)	41.25 (66.4 km.)
Speed 1 hour rating m.p.h.	20.8 (33.5 km.)	40.5 (65 km.)
Maximum safe speed	28 (45 km.)	53 (85 km.)
Tractive effort 30% coef. adh.	60,000 lb.	48,000 lb.

Substations

For the initial electric zone between Jundiahy and Campinas, one substation is being installed located at Louveira, a distance of 9.5 miles from Jundiahy. This station contains three 1,500 kw. 3 unit synchronous motor generator sets each arranged to operate its two generators in series for 3,000 volts. Power is received from an 88,000 volt 60 cycle transmission line and stepped down through three 3 phase, 1,900 kva. transformers to 2,300 volts for the synchronous motor.

The switchboard is similar in design to other 3,000 volt d. c. equipment. The 3,000 volt panels are installed together with the auxiliary station lighting panel. The high voltage panels include one for each of the motor generator sets, and one for each outgoing feeder. The main circuit breakers are located above and to the rear of the switchboard panels so as to be well out of reach to prevent accidental contact. They are remotely controlled from operating levers located on the front of the panels. A 3,000 volt line switch is also included with each circuit breaker. These switches are remote controlled from the front of the panel, as a safety measure. The switch handles for the circuit breakers are inverted to distinguish them from the line switches. The alternating current switchboard is electrically controlled throughout. For lightning protection a 96,000 volt aluminum cell arrester is installed in the high tension room of the station.

As a protection from short circuits and excessive overloads a high speed circuit breaker is installed with each motor generator set. This is connected to the negative terminal of the machine and arranged to connect a limiting resistance into the circuit upon opening. At the same time the station circuit breakers are opened, completely cutting off the power supply. The speed of these circuit breakers is such that resistance is inserted in the circuit before the short circuit current reaches sufficient value to injure the apparatus.

Other auxiliary equipment supplied to the station includes a 15 ton hand operated crane, a portable oil filter press and oil testing equipment, and a stationary compressor set. For control current a 4¾ kw. battery charging motor generator set is used with a 170-volt storage battery.

Power Lines

The railway company's high tension transmission line has been constructed with duplicate circuits mounted on separate wood poles between Jundiahy and Louveira, a total distance of 10 miles. At Jundiahy this line is permanently tied in with a new line constructed by the Sao Paulo Light & Power Co., extending a distance of about 17 miles to the hydro-electric station at Parnahyba. The power company's line is constructed with an H type pole line carrying the duplicate circuits. This transmission line from the water power plant to the substation will thus be operated over a distance of 43 km. as a single system at 88,000 volts 3 phase 60 cycle. The line is designed for ultimately supplying three substations and the conductors are of 1/0 B&S stranded copper which will insure a very low line loss under ordinary operating conditions. On the railway company's line two cross arms are used with large pin type insulators. A ground wire is also carried on each transmission line for lightning protection.

Secondary Distribution.—The overhead line construction is of the same general design as that used on the Chicago, Milwaukee & St. Paul. This is known as the twin catenary construction, having two 4/0 trolley wires supported from the same steel messenger by loop hangers. Wood poles suitably guyed are used for supporting the catenary. The hangers for the two contact wires are attached at alternate points, giving a most flexible type of construction and insuring the elimination of all "hard spots." Bracket supports are

used on single track construction and cross span for multiple track work. The normal height of the contact wire is 21 ft. above the rail. For all sidings and yard tracks a single wire is used over each track. The material furnished by the General Electric Company includes hangers, pull offs, copper and steel wire, miscellaneous hardware, etc., for 76 miles of track. The use of the twin catenary construction is particularly successful for lines operating heavy trains requiring the collection of large amounts of current through pantograph trolleys. In addition to the advantage of the two contact wires for handling the current required, this construction also insures practically sparkless commutation at the point of contact, both for heavy freight and high speed passenger operation.

Bonding

The weight of rails on this line is 91 lb. and these are bonded with the pin terminal type bond 42 inches in length and 211,600 circular mils cross section. Cross bonds are also used for interconnecting the rails of the same track and for bonding between tracks on the multiple track sections.

Locomotive Testing and Shipment

In the preparation of the electric locomotives for testing and for export shipment there are a number of unusual features which may be of interest. The gage of track on the Paulista Railway being 5 ft. 3 in. special arrangements were necessary to provide for removing the locomotives from the shop to the test track. To provide the necessary test track about one mile of extra rail was laid on the East Erie Commercial Railroad with 5 ft. 3 in. gage. In order to transport the locomotives from the shops to the test track, a distance of about three-quarters of a mile, special transfer trucks were used; one for each truck of the locomotive. By means of these trucks, which operate on their own wheels of standard gage, the locomotives were moved out over the usual transfer table and standard gage track to the special gage section provided for testing. Upon reaching this section they were moved off the transfer trucks over a ramp, the end of which was elevated to the same height as the special trucks.

A complete set of tests was run on all locomotives including regenerative braking and high speed running. After test the locomotives were transferred to the shipping department where they were disassembled and prepared for export shipment. The cab complete was removed from the truck and the pantograph, bells, etc., removed from the cab roof. Each truck was shipped separately without removing the motors from the truck frame. In the case of the passenger locomotive, each bogie truck was shipped with the adjacent motor truck without disassembling. On account of the large vessels available for making this shipment it was not necessary to reduce the locomotive to small packages.

Progress on the construction is shown by the fact that the first freight locomotive was ready for test March 15; during the month of May three freight and one passenger locomotives were shipped and progress on the balance of the order indicates that similar shipments will be made the following two months in accordance with the terms of the contract.

GEORGE W. LEE, chairman of the Temiskaming & Northern Ontario Railway Commission, announces that the Ontario Government has been recommended by this commission to place on sale through the municipalities of the North, the entire number of lots, between six and seven thousand, which the commission holds, outside of the railroad's right of way. As Government property these are not assessable, and the commission's decision is the result of a long series of protests from the municipalities where they are located.

New Rules Replace National Agreement at Altoona Works

PIECE work has been re-established, punitive overtime abolished and new classifications and rates of pay inaugurated in the Altoona works of the Pennsylvania System under an agreement between the management and the employees, which became effective on July 1, 1921. Details of the rules were made public in an announcement by P. F. Smith, Jr., works manager.

The new rules, which take the place of the Shop Crafts' National Agreement covering working conditions, were formulated by a committee representing the employees at Altoona works. These representatives, a committee of 75 employees, elected by secret Australian ballot, supervised jointly by the management and the employees, to represent the employees at the four shops comprising the Altoona Works, have also formed themselves into a permanent organization known as the Altoona Works Employees Association. The preamble of the constitution and by-laws adopted by the organization at its first meeting reads:

We, the employees of the Altoona Works, Pennsylvania System, in order to form an organization to establish satisfactory working conditions in our shops, provide means for fair dealing between the management and the employees, and to promote the general welfare of our community, do establish this constitution for the Altoona Works Employees Association.

The organization of the plan of employees representation, established at Altoona, provides as follows:

A local committee of three members to represent the employees in each class in each of the shop units; a shop committee, consisting of a local committee chairman of each craft to represent the employees in each of the shop units; an Altoona Works general committee, consisting of a shop chairman to represent all the employees in the shop crafts at Altoona, and a Works Council composed of all the local committeemen. The committeemen will serve for three years, one-third of the entire representation being elected every year.

In general, the most important of the new rules agreed to by the men and the management provide:

1. Re-establishment of piece work under the principles previously announced by the railroad, namely, under rates set so that piece workers can earn a rate which is higher than the day-work rate which may from time to time be established for day-workers.

2. A 48-hour basic week, with not more than nine hours on any one day, or less than eight hours on any day except Saturday. This permits the men to decide for themselves whether they shall work eight hours per day or more than eight hours on some days during the week, in order to get a half holiday on Saturday.

3. Where reduction in expenses becomes necessary, it may be accomplished either by reduction in force or reduction in hours of work, as the employees themselves decide.

4. Overtime to be paid *pro rata* for the ninth and tenth hours and time and one-half after the tenth hour.

5. Seniority based on length of service with the company, rather than length of membership in a particular craft.

6. Classification of work under a wide spread of rates, which permits the establishment of rates of pay based on skill required, rather than a flat rate, and gives a man doing more important work a higher rate of pay.

FOUR TRACKMEN WERE KILLED and three seriously injured on the Cumberland Valley division of the Pennsylvania Railroad near Milnor, Pa., on July 2, while riding to their work on a motor car. They met a freight train and their car was wrecked. There was a dense fog at the time.

General News Department

The American Association of Railroad Ticket Agents will hold its third annual convention at St. Paul, Minn., on August 19 and 20.

The Chicago, Burlington & Quincy on July 1, put on 1,500 workmen to repair grain and coal cars, according to E. P. Bracken, vice-president in charge of operation, to make ready for the expected heavy movement of these commodities.

An erroneous statement occurs in the sixth sentence of an article describing the Minich safety hand brake published on page 1464 of the June 24 *Railway Age*. The sentence should read "The usual brake chain is eliminated, being replaced by a connecting bar attached to the brake rod (or air brake lever on hopper cars)."

The Southern Pacific in connection with its fuel economy campaign will reward the engineer and fireman on each division having the best fuel efficiency and economy record for the year with a trip to Chicago as representatives of the company at the next International Railway Fuel Association's annual convention with all expenses paid including time lost.

A fire in the yards of the Chicago Junction at West Forty-third street, Chicago, on July 4, the origin of which has not been determined, destroyed a yard office and 20 empty freight cars and damaged 40 others, with an estimated loss of $35,000. The fire started in some loose rubbish in the yard near an oil house and spread when a barrel of oil exploded and scattered the flames.

The running of freight trains on Sunday in the State of Georgia normally forbidden by law, but allowed since August 20, 1917, because of war conditions, is now the subject of an inquiry by the State Railroad Commission, which has called upon the carriers to report on the matter by July 25. The suspension of the law was made through an order of the Commission, and the Commission now proposes to revoke that order under authority provided in the statute. Forty-five railroads have been called upon to report.

The Pennsylvania Railroad has once more been contending with the Bigelow Boulevard slide at Pittsburgh, Pa., which, due to recent rains has become somewhat troublesome. About 10 days ago small quantities of earth started to work out over the tracks adjacent to the hillside and while steam shovels had been brought up to the site in anticipation of a movement the slide encroached upon the two inside tracks. These have since been cleared. The movement, on last report, had ceased and will, apparently, give no further trouble unless some heavy rains occur.

Northern Pacific Signal Department

In the signal department of the Northern Pacific a general reorganization, which has just gone into effect, provides for an increase in supervising forces to provide closer supervision and more assistance to their workmen. Under the new arrangement there is one supervising officer to approximately every five men, while formerly the ratio was as one to eight. Prior to July 1 the men were on a monthly rate of pay, but will now work under hourly rates; this at the request of the Brotherhood of Railroad Signalmen of America.

Express Messenger Shot

The express messenger on train No. 44, eastbound, on the Cleveland, Cincinnati, Chicago & St. Louis, was shot twice when he resisted two robbers who boarded the express car at Covington, Ind., early on the morning of July 1 and made away with loot estimated at $9,000 in cash and securities which they took from the safe in the car. The robbery was discovered at Veedersburg, Ind., 12 miles east of Covington, when the express messenger was found beneath a pile of express bags which had been stacked upon him. It is believed the robbers dropped from the train as it slowed down at Veedersburg.

Railway Earnings for May

The net operating income of the railroads for May made a somewhat better showing than in the preceding months of this year. For 200 Class I roads it was $37,160,000, as compared with a deficit of $4,882,000 last May. The operating revenues were $441,000,000, a decrease of 2.7 per cent, and the expenses were $376,000,000, a reduction of 13.1 per cent.

Operating Statistics

The average mileage per freight car per day for the month of April, according to the Interstate Commerce Commission's monthly operating statistics was 20.6 as compared with 19.5 in April, 1920. This average, however, is less than that established during April in 1917, 1918 or 1919. The average net tons per loaded car was 26.9 as compared with 28.6 and the net tons per train averaged 637 as compared with 647. The percentage of unserviceable cars was 12.3 as compared with 6.5.

Tentative Valuations Served

The Interstate Commerce Commission during the past week has served a number of additional tentative valuations of the smaller roads. The commission's figures for the final valuation of the property used as of the valuation date are as follows:

Gainesville Midland	1915	$1,174,665
St. Johns River Terminal Co.	1915	1,880,705
Spokane International Railway Co.	1917	5,330,039
Coeur d'Alene & Pend d'Oreille	1917	400,000
Tonopah & Goldfield	1915	1,856,150
Washington, Potomac & Chesapeake	1915	216,656
Delaware & Northern	1916	1,417,210
Caddo & Choctaw	1916	238,161
Great Southern	1916	764,401
Bridgton & Saco River	1916	360,563
Wiscasset, Waterville & Farmington	1916	500,168
Colorado-Kansas	1916	365,778
Pacific & Idaho Northern	1916	2,100,176
Fourche River Valley & Indian Territory	1916	257,000
Intermountain	1916	991,127

Chairman Clark Receives Replies to Coal Supply Letter

Chairman Clark of the Interstate Commerce Commission has received replies to his letters which, as noted in last week's issue, were sent to the associations representing the railroads and public utilities urging the importance of accumulating a reasonable reserve supply of coal in advance of the period of heaviest demand this fall and winter. Thomas De Witt Cuyler, chairman of the Association of Railway Executives, said the letter would be submitted to a meeting of the standing committee of the association and that he would urge that prompt action be taken. G. W. Elliott, of the National Committee on Gas and Electric Service, said he would endeavor to have the suggestions conveyed to the public utilities through channels that would be the most effective and that the commission's thoughtfulness regarding the coal requirements would be appreciated. M. H. Aylesworth, executive general manager of the Electric Light Association, said that some definite action on the subject would be taken at once.

Honorary Degrees

At the recent commencement exercises in the universities and colleges honorary degrees were conferred upon a number of men in or closely associated with the railroad business. Harvard University conferred the degree of Master of Arts upon William J. Cunningham, its James J. Hill Professor of Transportation. Benjamin B. Greer, vice-president of the Chicago, Milwaukee & St. Paul, was given the degree of Master of Arts by Dartmouth College, of which he is an alumnus. E. G. Buckland, vice-president and general counsel of the New York, New Haven & Hartford, was given the degree of Doctor of Laws by Washburn College, of which he is an alumnus.

Changes in Car Service Rules

The car service rules of the American Association have been amended by numerous changes in Rules 1, 2, 3, 4 and 5; and by letter ballot, closed on June 23, these changes, unanimously approved by the general committee and also by the committee on car service, were ordered to go into effect on July 1.

The important changes are: In Rule 2, the provision for the return to the owner of empty cars located at junction points with the home road; in Rule 3, for a more favorable operation with respect to empty car mileage, by the elimination of paragraphs d and e of the present rule and the substitution therefor of a provision under which a road, unable to dispose of empty cars belonging to indirect connections by loading them to or in the direction of home, may return them to the road from which received, on the basis of record rights.

The use of the home route card is re-established.

At the same time the per diem rules were amended by the addition of more detailed provisions in Rules 1, 7, 13, 14 and 15, increasing the strictness of the regulations for correcting errors in settlements. By Rule 15 a road failing to receive promptly from a connection empty cars, at home on its road, moving home under car service rules, shall be responsible to the connection for double the per diem on such cars.

Valuation Field Work, Eastern District, Completed

The engineering field work of the eastern district, Bureau of Valuation, Interstate Commerce Commission, has been completed. The eastern district includes the states of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, District of Columbia, West Virginia, Virginia, and North Carolina.

The field party work was begun on February 26, 1914, and completed on June 30, 1921. The district field organization included 12 roadway parties, but this force was not maintained during the war years of 1917 and 1918, due to the fact that the bureau released over 600 engineers for military and naval service, of which the eastern district contributed a due proportion. The record shows that the work was in progress about seven years, but after making due allowance for vacancies which existed during the war, and the lesser number of parties in use during the organization and demobilization periods, it appears that the field party work in the eastern district was completed in five years. This estimate is based upon an average of 12 full roadway field parties. The eastern district includes 43,000 miles of steam railroads whose all-track mileage is 82,500, and 50,000 miles of telegraph lines.

The field work having been completed, the eastern district is now concentrating all of its engineering force on the preparation of the reports showing the cost of reproduction new and the cost of reproduction less depreciation.

W. H. BARR, president of the National Founders' Association, has sent out a letter calling on members of the association to work for the complete abolition of national railroad labor agreements; restoration to the carriers of individual jurisdiction over wages, classifications and working conditions; repeal of the Adamson law and funding of the indebtedness of the railroads of the country. Mr. Barr points out that this is one of the few times where the association has recommended intensive action by its members, but that restoration of railroad prosperity on sound lines is now a recognized necessity. He says that business men generally must arouse themselves to the serious condition confronting the railroads.

Traffic News

Six thousand tons of rails for the Alaskan Railroad are to be sent by water direct from Mobile, Ala., to Seward, Alaska, by way of the Panama Canal.

T. L. Wolfe, for the last five years vice-president and traffic manager for the A. E. Staley Manufacturing Company of Decatur, Ill., has resigned. He is succeeded as traffic manager by Thornton Burwell, formerly assistant traffic manager.

The Traffic Club of Wheeling, W. Va., has elected the following officers: President, H. H. Marsh; vice-president, H. J. Hofmann; treasurer, C. W. Henry, and secretary, P. M. Neigh. Members of the board of governors are C. W. Henry, W. H. Higgins, P. M. Neigh, H. H. Marsh, J. A. Fleming, R. J. Miegel, E. C. Jepson, H. J. Hofmann, A. T. Oxtoby, S. C. Williams, G. W. Koonce and Douglas Vass.

The establishment of a government line of ships between the United States and Alaska to connect with the government railroad is proposed in a bill introduced in the Senate by Senator Cummins and referred to the Committee on Territories. Under the bill the Shipping Board would be required to transfer to the Secretary of the Interior ships of sufficient number and tonnage to operate between the United States and Alaska ports and the President would be given authority to co-ordinate all government agencies having to do with Alaskan affairs.

The principal coal carrying roads serving West Virginia and Pennsylvania mines in carrying cargo coal to the lower lake ports have filed with the Interstate Commerce Commission application for special permission to make the 28 cent reduction on lake cargo coal apply only on coal going beyond the upper lake ports. A complaint against this reduction on the ground of discrimination has been filed with the commission by the Morton Salt Company, which alleges that as its plants are located at Port Huron and Ludington, Mich., it is damaged by reason of the preference given to west bank Lake Michigan ports.

Coal Production

Production of soft coal increased slightly during the week ending June 25, but was still short of the 8,000,000-ton mark. The output is estimated at 7,769,000 net tons, which is about 350,000 tons below the rate maintained from May 14 to June 11. The Geological Survey says the present recession in output is now seen to be due to a marked decrease in shipments from the mines to the lake front and a slight decrease in the movement to tidewater.

Interstate Commerce Commission Opposes Reduced Mileage Fares

Both the Senate and the House committees on interstate commerce, to which have been referred various bills introduced in Congress to require the railroads to issue interchangeable mileage books at reduced rates, have called upon the Interstate Commerce Commission for an opinion as to the advisability of such legislation. Chairman Clark of the commission has written a letter to the House committee opposing a reduction of passenger fares at this time on the ground that it would reduce railroad revenues, which are already insufficient to pay their return on the investment. A hearing on the subject of reduced mileage rates was held before a sub-committee of the Senate committee on interstate commerce on June 27, at which reduced mileage rates were advocated by representatives of the commercial travellers' organization and opposed by representatives of the railroads. The letter said that approximately one-third of the passenger travel represents commercial travel and that a reduction would reduce the revenues which the railroads are now receiving from this traffic, while it would not stimulate additional travel sufficiently to make up for the loss.

Operating Statistics of Large Steam Roads — Selected Items for the Month of April, 1921,

Region, road and year	Average miles of road operated	Train-miles	Locomotive-miles: Principal and helper	Locomotive-miles: Light	Car-miles: Loaded (thousands)	Car-miles: Empty (thousands)	Car-miles: Per cent loaded	Ton-miles (thousands): Gross. Excluding locomotive and tender	Ton-miles (thousands): Net. Revenue and non-revenue	Locomotives on line daily: Service-able	Un-service-iceable	Per cent unserv-iceable	Stored
New England Region:													
Boston & Albany 1921	394	220,385	237,696	26,416	4,081	2,410	62.9	216,812	81,690	129	28	17.8	...
1920	394	290,256	309,246	33,202	5,300	2,664	66.5	291,062	126,973	130	32	19.8	...
Boston & Maine..... 1921	2,469	489,087	543,926	47,003	10,242	4,521	69.4	536,513	223,839	353	107	23.3	71
1920	2,469	452,630	837,088	73,577	14,127	5,476	72.1	760,278	341,575	348	114	24.7	3
N. Y., N. H. & H..... 1921	1,959	433,899	465,465	27,914	9,734	4,858	66.7	506,194	212,045	301	71	19.1	35
1920	1,938	365,835	377,278	29,620	7,180	1,984	78.4	349,009	163,582	289	112	27.9	8
Great Lakes Region:													
Delaware & Hudson..... 1921	880	342,539	447,123	30,334	8,241	5,358	60.5	558,674	273,965	277	38	12.1	118
1920	858	416,699	574,425	39,100	10,298	4,911	67.7	687,225	369,147	255	41	13.9	15
Del., Lack. & Western..... 1921	997	495,662	605,651	113,703	14,810	7,212	67.3	837,989	388,453	305	54	15.0	41
1920	997	300,355	365,582	68,225	7,951	3,686	68.3	464,236	232,708	285	76	21.1	48
Erie (inc. Chic. & Erie)... 1921	2,259	788,251	892,428	36,926	25,109	12,573	66.6	1,492,423	687,487	579	137	19.1	127
1920	2,259	672,283	761,825	35,846	19,056	7,808	70.9	1,137,822	572,085	560	122	17.9	116
Lehigh Valley 1921	1,431	523,374	579,759	55,810	14,542	8,676	62.6	897,340	418,206	421	118	21.9	140
1920	1,429	426,569	473,129	53,753	10,435	5,013	67.5	652,530	329,333	336	190	36.1	100
Michigan Central 1921	1,829	414,321	421,184	17,994	12,598	6,955	64.4	661,567	271,243	328	91	21.7	105
1920	1,826	325,898	353,571	13,697	8,997	3,369	72.8	476,110	224,814	335	80	19.3	...
New York Central..... 1921	5,646	1,498,778	1,638,337	116,823	51,420	29,526	63.5	2,913,391	1,230,250	1,089	564	34.1	381
1920	5,646	1,787,274	2,010,044	153,962	54,011	32,460	62.5	3,259,987	1,479,892	(1)	(1)	(1)	(1)
N. Y., Chic. & St. L..... 1921	572	312,729	314,061	409	9,360	4,528	67.4	479,844	186,286	111	55	33.1	39
1920	573	190,822	191,347	1,308	5,325	1,664	76.2	271,752	125,041	106	73	40.8	39
Pere Marquette 1921	2,207	304,180	319,363	6,162	7,803	3,647	68.1	371,817	202,114	161	48	22.9	19
1920	2,200	245,361	256,651	4,512	5,654	1,953	74.3	290,527	141,458	161	45	21.8	7
Pitts. & Lake Erie..... 1921	225	68,966	75,880	850	2,226	1,458	60.4	157,503	83,836	69	14	16.9	28
1920	225	49,982	51,749	3,003	1,694	805	67.8	122,242	72,419	68	14	17.1	42
Wabash 1921	2,418	487,970	507,256	6,213	14,190	6,594	68.3	753,118	313,268	274	69	20.1	47
1920	2,418	378,696	386,163	7,503	8,572	2,807	75.3	438,424	202,086	249	81	24.5	6
Ohio-Indiana-Allegheny Region:													
Baltimore & Ohio..... 1921	5,185	1,515,880	1,892,092	114,088	36,815	23,590	60.9	2,325,703	1,109,839	1,008	427	29.8	196
1920	5,154	1,498,907	1,887,805	102,888	36,173	18,537	66.1	2,398,604	1,268,643	1,025	294	22.3	77
Central of N. J..... 1921	679	240,391	266,263	34,920	5,452	3,620	60.1	361,798	179,295	194	70	26.5	17
1920	679	200,013	218,913	23,728	3,495	2,092	62.6	229,582	116,250	209	55	20.8	...
Chicago & Eastern Ill..... 1921	1,131	191,036	192,034	2,918	4,438	2,554	63.5	263,307	128,649	130	46	26.1	54
1920	1,131	194,092	197,257	4,179	3,892	2,234	63.5	243,890	123,658	103	70	40.5	4
C., C., C. & St. L..... 1921	2,375	581,874	608,815	1,710	15,084	11,291	57.2	963,036	412,843	324	118	26.7	62
1920	2,393	515,470	531,640	734	12,625	6,454	66.2	796,015	351,841	288	115	28.5	25
Elgin, Joliet & Eastern..... 1921	836	82,202	90,558	6,060	2,394	1,093	68.7	169,842	91,360	99	9	8.3	34
1920	833	133,476	151,439	10,082	3,623	2,218	62.0	275,318	148,507	94	14	13.0	...
Long Island 1921	395	39,767	47,013	6,809	451	289	60.9	24,403	9,053	34	9	20.8	4
1920	395	29,152	39,979	8,450	267	149	64.0	13,545	5,401	36	12	24.0	...
Pennsylvania System 1921	10,875	3,401,711	3,692,280	253,714	86,918	51,247	62.9	5,856,170	2,910,799	2,714	703	20.6	1,017
1920	10,862	3,919,348	4,336,683	339,748	88,552	46,486	65.6	5,764,641	3,020,456	1,934	1,042	35.0	38
Phila. & Reading..... 1921	694	472,741	534,077	66,568	11,743	7,350	61.5	803,337	437,347	348	82	19.1	139
1920	690	530,178	604,652	76,162	12,497	6,077	67.3	850,095	485,049	288	87	23.2	8
Pocahontas Region:													
Chesapeake & Ohio..... 1921	2,543	663,409	715,869	18,469	18,289	14,228	56.2	1,416,087	750,407	440	110	20.0	75
1920	2,520	787,544	861,060	34,583	22,251	14,920	59.9	1,673,832	930,597	403	134	25.0	15
Norfolk & Western..... 1921	2,210	599,817	733,800	24,515	16,472	10,655	60.7	1,220,806	656,550	581	106	15.4	235
1920	2,191	662,402	819,625	42,357	17,226	10,823	61.4	1,378,841	778,501	409	275	40.2	34
Southern Region:													
Atlantic Coast Line..... 1921	4,887	722,279	725,522	11,621	15,391	11,089	58.1	938,499	298,449	294	122	29.3	3
1920	4,891	719,292	720,952	10,655	15,201	8,005	65.5	798,685	318,611	275	141	33.9	...
Central of Georgia..... 1921	1,908	227,127	228,931	2,457	4,507	2,142	67.8	243,078	109,425	115	23	16.7	...
1920	1,913	226,742	228,716	3,850	4,573	1,563	74.5	239,817	113,270	104	22	17.5	...
I. C. (inc. Y. & M. V.)... 1921	6,151	1,542,194	1,548,706	34,636	37,764	21,664	63.5	2,361,943	1,065,897	746	102	12.0	24
1920	6,151	1,713,566	1,720,472	35,188	42,838	18,452	69.9	2,551,944	1,205,318	722	112	13.4	17
Louisville & Nashville..... 1921	5,026	1,383,561	1,466,703	51,929	23,148	15,494	59.9	1,482,763	690,367	556	99	15.1	53
1920	5,024	1,419,094	1,522,780	46,898	24,231	12,751	65.5	1,455,695	705,861	495	143	22.4	...
Seaboard Air Line..... 1921	3,537	422,260	426,294	4,840	8,775	5,126	63.1	474,533	177,605	175	85	32.8	...
1920	3,537	481,790	487,438	6,994	10,223	5,066	66.9	556,439	236,679	189	84	30.9	...
Southern Ry..... 1921	6,942	1,125,014	1,143,239	27,073	23,933	11,607	67.3	1,246,083	511,631	906	216	19.3	131
1920	6,942	1,408,167	1,444,814	49,111	32,555	12,517	72.2	1,687,445	767,287	932	179	16.1	6
Northwestern Region:													
C. & N. W..... 1921	8,319	1,286,091	1,316,712	19,289	24,742	14,202	63.5	1,357,704	584,526	625	331	34.6	22
1920	8,008	1,486,522	1,519,090	27,704	28,826	13,736	67.7	1,614,824	722,924	675	243	26.4	1
C., M. & St. P..... 1921	10,618	1,200,146	1,238,637	57,306	28,361	15,924	64.0	1,537,809	659,576	786	268	25.0	152
1920	10,626	1,553,004	1,611,300	65,937	37,395	17,723	67.8	2,058,708	970,353	656	308	32.0	2
C., St. P., M. & O..... 1921	1,726	263,381	275,874	10,501	4,684	2,093	69.1	240,484	85,876	155	53	25.5	38
1920	1,726	315,339	331,475	14,000	5,808	1,461	79.9	281,875	134,465	156	55	26.1	24
Great Northern..... 1921	7,982	631,653	651,268	25,229	16,337	6,751	70.8	877,445	421,305	614	177	22.4	280
1920	7,985	987,971	1,034,670	49,804	27,374	8,811	75.7	1,459,771	739,747	508	223	30.5	18
M., St. P. & S. Ste. M..... 1921	4,225	412,309	416,645	5,652	8,591	3,944	68.6	436,910	194,688	346	54	13.5	52
1920	4,227	515,062	521,105	8,554	11,664	3,144	78.9	535,436	264,353	312	83	21.0	30
Northern Pacific..... 1921	6,408	610,976	636,315	41,613	17,286	7,618	69.4	944,997	441,230	554	165	22.9	166
1920	6,428	903,058	956,452	67,230	26,121	9,286	73.8	1,422,120	705,103	536	143	21.1	29
Ore.-Wash. R. R. & Nav... 1921	2,198	177,551	195,397	23,425	4,594	1,608	74.1	255,763	128,626	116	46	28.4	11
1920	2,189	209,853	235,991	31,895	4,973	1,214	80.4	264,915	139,412	108	48	30.8	...
Central Western Region:													
Atch., Top. & Santa Fe.... 1921	9,771	1,464,640	1,553,854	67,208	36,809	21,951	62.6	2,111,520	761,575	809	160	16.5	158
1920	9,517	1,538,039	1,613,497	73,419	36,523	16,618	68.7	1,981,802	829,358	658	251	27.6	8
Chicago & Alton..... 1921	1,010	292,557	297,818	3,601	5,925	3,881	60.4	363,853	159,827	107	42	28.2	21
1920	1,010	231,584	236,468	3,553	4,268	2,149	66.5	252,650	118,688	102	51	33.3	23
Chi., Burl. & Quincy..... 1921	9,326	1,340,756	1,398,889	62,916	34,142	20,076	63.0	2,040,557	952,652	700	258	26.9	139
1920	9,304	1,563,796	1,640,051	74,730	41,752	17,253	70.8	2,340,568	1,154,285	624	264	29.7	...
Chi., Rock Island & Pacific. 1921	7,662	1,178,516	1,190,502	10,925	24,090	13,246	64.5	1,329,013	550,613	558	179	24.3	40
1920	7,657	1,243,469	1,261,753	12,231	24,475	10,272	70.4	1,296,316	584,057	456	239	34.4	15
Denver & Rio Grande..... 1921	2,593	166,133	204,455	37,053	3,640	1,651	68.8	205,299	98,641	223	86	27.8	62
1920	2,585	209,295	256,729	49,910	3,851	1,651	70.0	222,733	114,961	203	97	32.3	4
Oregon Short Line..... 1921	2,359	260,087	268,115	16,586	5,783	2,708	68.1	344,036	166,205	184	45	19.7	51
1920	2,348	335,960	348,062	31,252	7,670	2,714	73.9	430,404	221,351	166	61	26.9	7
Southern Pacific 1921	6,975	978,186	1,125,722	222,071	25,494	15,268	62.5	1,509,274	599,972	537	227	29.7	49
1920	6,951	870,789	984,433	171,918	20,798	9,112	69.5	1,165,324	528,452	523	189	26.6	11
Union Pacific..... 1921	3,615	662,755	672,300	31,356	20,898	7,590	73.4	1,097,593	485,272	393	158	28.7	114
1920	3,614	879,372	897,372	44,134	21,889	6,429	77.3	1,126,898	534,696	342	153	30.9	32
Southwestern Region:													
Gal., Harrisb'g & S. An... 1921	1,367	243,688	244,768	449	4,886	2,974	62.2	296,781	126,476	73	45	38.1	...
1920	1,372	256,291	257,549	910	5,317	2,654	66.7	315,967	145,340	82	40	32.8	...
Gulf, Colo. & Santa Fe..... 1921	1,895	252,423	256,733	4,876	6,032	3,282	64.8	348,995	157,561	90	56	38.4	...
1920	1,895	260,773	265,174	8,793	5,992	2,209	73.1	317,325	146,951	103	43	29.5	1
Missouri, Kans. & Tex..... 1921	1,710	219,614	219,940	5,930	5,534	3,450	61.6	314,592	128,431	131	47	26.4	48
1920	1,710	271,609	272,446	5,230	6,395	3,844	62.5	363,924	150,274	103	22	17.6	4
Mo., Kans. & Tex. of Tex.. 1921	1,740	209,778	214,140	1,898	4,085	2,940	58.1	248,602	99,884	101	48	32.2	22
1920	1,740	258,768	264,163	10,789	4,639	2,544	64.6	263,852	114,154	109	46	29.7	1
Missouri Pacific..... 1921	7,263	1,003,875	1,010,447	26,744	22,470	10,426	68.3	1,269,213	574,851	381	178	31.8	28
1920	7,263	1,010,559	1,016,390	30,076	21,838	8,177	72.8	1,205,211	576,619	392	144	26.9	...
St. Louis-San Francisco.... 1921	4,761	717,566	727,479	12,258	12,364	6,648	65.0	708,247	307,481	338	151	30.9	45
1920	4,761	823,075	835,203	17,162	13,190	6,833	65.9	761,317	344,144	375	112	23.0	...
Texas & Pacific..... 1921	1,952	272,498	272,498	3,808	5,789	3,285	63.8	324,853	126,785	118	76	39.0	18
1920	1,947	323,821	323,821	6,781	6,387	3,040	67.8	354,502	149,679	123	70	36.3	...

[1]Data not available.

[2]On basis of way bill weights and distances.

Compared with April, 1920, for Roads with Annual Operating Revenues above $25,000,000

Region, road and year	Average Number of Freight Cars on line daily: Home	Foreign	Total	Per cent unserviceable	Stored	Gross tons per train, excluding locomotive and tender	Net tons per train	Net tons per car	Net ton miles per car-day	Car-miles per car-day	Net ton miles per mile of road per day	Pounds of coal per 1,000 gross ton-miles, including locomotive and tender	Passenger Service: Train-miles	Passenger train car-miles
New England Region:														
Boston & Albany.....1921	3,442	4,409	7,851	6.7	1,078	984	371	20.0	347	27.6	6,912	205	306,682	1,939,864
1920	563	10,655	11,218	3.5	.....	1,003	438	24.0	377	23.7	10,744	209	308,051	1,948,584
Boston & Maine.....1921	17,750	13,719	31,469	18.7	4,717	1,097	458	21.9	237	15.6	3,022	157	839,921	4,424,126
1920	7,152	34,093	41,245	7.9	.....	1,010	454	24.2	276	15.8	4,612	...	841,391	4,540,961
N. Y., N. H. & H.....1921	24,469	15,887	40,356	17.0	3,028	1,167	489	21.8	175	12.1	3,608	175	1,037,818	6,443,292
1920	8,049	43,382	51,431	5.9	.....	954	447	22.8	106	5.9	2,813	204	1,039,994	6,444,530
Great Lakes Region:														
Delaware & Hudson.....1921	11,309	5,735	17,044	8.7	2,381	1,631	800	33.2	536	26.6	10,373	195	185,875	951,293
1920	3,561	14,234	17,795	5.8	.....	1,649	886	35.8	691	28.5	14,335	204	181,302	926,203
Del., Lack. & Western...1921	16,861	6,813	23,674	9.3	955	1,691	784	26.2	547	31.0	12,991	177	479,606	3,446,633
1920	4,992	20,693	25,685	4.1	.....	1,546	775	29.3	302	15.1	7,782	...	410,152	2,839,449
Erie (inc. Chic. & Erie)..1921	39,011	14,626	53,637	15.3	16,131	1,893	872	27.4	427	23.4	10,146	151	661,430	4,948,977
1920	8,078	50,515	58,593	6.9	.....	1,692	851	30.0	325	15.3	8,443	182	527,993	3,608,071
Lehigh Valley.....1921	31,572	9,788	41,360	14.7	3,620	1,715	799	28.8	337	18.7	9,744	161	355,767	2,652,544
1920	10,718	28,908	39,626	6.2	.....	1,530	772	31.6	277	13.0	7,680	216	366,389	2,530,861
Michigan Central 1921	19,147	10,649	29,796	15.4	2,472	1,597	655	21.5	303	21.9	4,942	128	556,851	4,769,008
1920	4,175	37,081	41,256	5.4	.....	1,461	690	25.0	182	10.0	4,105	...	579,785	5,320,197
New York Central.....1921	89,932	48,149	138,081	10.7	33,006	1,944	821	23.9	297	19.5	7,263	125	2,272,325	17,732,476
1920	26,155	132,939	159,094	6.8	.....	1,824	828	27.4	310	18.1	8,737	...	2,381,083	17,835,326
N. Y., Chic. & St. L.....1921	6,357	4,398	10,755	14.9	2,318	1,534	596	19.9	577	43.0	10,856	119	89,005	532,219
1920	1,394	7,896	9,290	6.3	.....	1,424	655	23.5	449	25.1	7,280	...	62,501	428,762
Pere Marquette.....1921	10,903	9,861	20,764	14.2	1,000	1,222	665	25.9	325	18.4	3,052	162	280,123	1,368,844
1920	3,824	19,140	22,964	5.9	.....	1,184	577	25.0	205	11.0	2,143	194	264,786	1,280,022
Pitts. & Lake Erie.....1921	17,373	7,804	25,177	13.4	2,743	2,284	1,216	37.7	111	4.9	12,441	89	108,118	565,236
1920	3,635	19,835	23,470	8.7	.....	2,446	1,449	42.8	103	3.6	10,750	100	91,901	446,090
Wabash 1921	13,039	9,160	22,199	11.2	.....	1,453	642	22.1	470	31.2	4,319	167	508,429	2,627,692
1920	5,548	18,257	23,805	10.1	.....	1,158	534	23.6	283	15.9	2,786	231	534,928	2,667,553
Ohio-Indiana-Allegheny Region:														
Baltimore & Ohio.....1921	69,967	27,878	97,845	12.1	6,414	1,534	732	30.1	378	20.6	7,135	183	1,342,466	8,495,894
1920	22,883	70,041	92,924	6.8	.....	1,600	846	35.1	455	19.6	8,206	...	1,281,739	7,556,286
Central of N. J.....1921	20,458	8,596	29,054	29.5	4,478	1,505	746	32.9	206	10.4	8,808	193	311,724	1,465,664
1920	5,231	18,021	23,252	7.5	.....	1,148	581	33.3	167	8.0	5,709	...	300,017	1,251,436
Chicago & Eastern Ill...1921	17,247	2,389	19,636	9.8	8,188	1,378	673	29.0	218	11.9	3,792	181	231,849	1,473,984
1920	10,032	13,128	23,160	7.5	.....	1,257	637	31.8	178	8.8	3,645	...	227,570	1,483,056
C., C., C. & St. L.....1921	19,023	15,537	34,560	11.2	3,621	1,655	710	27.4	398	25.4	5,793	140	708,644	4,547,638
1920	3,002	31,101	34,103	4.3	.....	1,544	683	27.9	344	18.6	4,900	...	693,479	4,125,554
Elgin, Joliet & Eastern...1921	10,468	3,970	14,438	4.5	3,952	2,066	1,111	38.2	211	8.1	3,641	150	(2)	(2)
1920	8,082	8,287	16,369	7.8	.....	2,063	1,113	41.0	302	11.9	5,941	...	(2)	(2)
Long Island.....1921	2,151	3,557	5,708	3.8	980	614	228	20.1	53	4.3	765	134	189,358	1,008,575
1920	552	6,029	6,581	2.4	.....	465	185	20.2	27	2.1	456	...	163,338	857,985
Pennsylvania System.....1921	214,016	66,956	280,972	7.5	88,696	1,722	856	33.5	345	16.4	8,922	145	4,879,312	32,354,037
1920	98,349	213,721	312,070	6.0	.....	1,471	771	34.1	323	14.4	9,269	..	4,917,204	31,484,923
Phila. & Reading.....1921	27,644	11,095	38,739	10.2	5,877	1,700	925	37.2	376	16.4	21,004	182	512,254	2,317,968
1920	7,601	32,293	39,894	3.9	.....	1,603	915	38.8	405	15.5	23,431	...	496,530	2,257,008
Pocahontas Region:														
Chesapeake & Ohio.....1921	38,252	11,838	50,090	8.2	9,550	2,135	1,131	41.0	499	21.6	9,835	134	427,885	2,427,132
1920	10,968	23,607	34,575	10.2	.....	2,125	1,182	41.8	897	35.8	12,310	...	411,859	2,242,170
Norfolk & Western.....1921	37,664	5,919	43,583	8.0	9,197	2,035	1,095	39.9	502	20.7	9,903	168	378,324	2,329,900
1920	10,955	20,160	31,115	5.9	.....	2,082	1,175	45.2	834	30.0	11,843	...	386,114	2,943,556
Southern Region:														
Atlantic Coast Line.....1921	22,392	11,016	33,408	15.5	.....	1,161	413	19.4	298	26.4	2,036	145	841,045	5,920,071
1920	6,035	30,250	36,285	11.8	.....	1,110	443	20.9	293	21.3	2,171	..	794,730	5,417,094
Central of Georgia.....1921	4,996	3,792	8,788	23.7	.....	1,070	482	24.3	415	25.2	1,912	160	311,408	1,562,112
1920	1,461	7,653	9,114	4.8	.....	1,058	500	24.8	414	22.4	1,974	...	296,110	1,576,627
I. C. (inc. Y. & M. V.)..1921	47,777	17,183	64,960	8.1	11,351	1,545	691	28.2	547	30.5	5,776	143	1,457,936	9,085,445
1920	12,546	44,881	57,427	5.5	.....	1,489	703	28.1	700	35.6	6,531	...	1,417,755	8,934,421
Louisville & Nashville...1921	38,530	14,170	52,700	22.7	117	1,072	499	29.8	437	24.4	4,578	167	904,134	5,135,687
1920	13,154	27,988	41,142	7.5	116	1,026	497	29.1	572	30.0	4,683	...	880,545	5,259,640
Seaboard Air Line.....1921	11,544	8,445	19,989	21.5	.....	1,124	421	20.2	296	23.2	1,674	181	576,745	3,358,856
1920	3,386	23,453	26,839	5.8	.....	1,155	491	23.2	294	19.0	2,230	205	549,241	3,251,556
Southern Ry.....1921	39,614	20,326	59,940	10.3	7,341	1,108	455	21.4	285	19.8	2,457	205	1,319,232	8,095,064
1920	15,041	51,698	66,739	4.5	.....	1,198	543	23.6	383	22.5	3,684	...	1,453,929	8,837,315
Northwestern Region:														
C. & N. W.....1921	48,274	21,803	70,077	8.1	7,000	1,056	455	23.6	278	18.5	2,342	205	1,613,599	9,642,837
1920	23,508	59,420	82,928	6.6	.....	1,086	486	25.3	291	17.1	3,009	...	1,599,949	9,537,972
C., M. & St. P.....1921	44,725	16,182	60,907	13.4	5,633	1,281	550	23.3	361	24.2	2,071	151	1,437,736	8,650,519
1920	20,235	63,672	83,907	6.6	.....	1,326	625	25.9	385	21.9	3,044	...	1,346,782	8,657,100
C., St. P., M. & O.....1921	3,933	11,742	15,675	11.3	4,163	913	326	18.3	183	14.4	1,658	190	312,750	1,744,372
1920	1,626	10,445	12,071	8.7	.....	894	426	23.2	371	20.1	2,597	...	307,273	1,815,218
Great Northern.....1921	48,824	7,398	56,222	14.6	.....	1,389	667	25.8	250	13.7	1,759	177	968,931	5,672,123
1920	19,491	27,155	46,646	8.4	.....	1,478	749	27.0	529	25.9	3,088	...	938,140	5,704,547
M., St. P. & S. Ste. M...1921	17,138	6,275	23,413	12.2	3,524	1,060	472	22.6	277	17.8	1,536	140	425,873	2,298,438
1920	5,548	15,006	20,554	6.5	.....	1,040	513	22.7	429	24.0	2,085	155	416,489	2,334,719
Northern Pacific.....1921	37,862	7,212	45,074	12.3	11,008	1,547	722	25.5	326	18.4	2,295	143	823,226	5,088,563
1920	13,170	21,462	34,632	8.3	.....	1,575	781	27.0	679	34.1	3,657	146	789,953	5,383,825
Ore.-Wash. R. R. & Nav..1921	5,113	3,767	8,880	4.2	2,067	1,441	724	28.0	483	23.3	1,951	211	247,742	1,592,742
1920	2,744	5,936	8,680	1.9	.....	1,262	664	28.0	535	23.8	2,123	...	231,830	1,516,329
Central Western Region:														
Atch., Top. & Santa Fe..1921	47,538	12,222	59,760	9.9	10,990	1,442	520	20.7	425	32.8	2,598	156	1,744,476	13,152,464
1920	25,835	47,463	73,298	7.5	.....	1,289	530	22.7	377	24.2	2,905	170	1,792,462	13,714,661
Chicago & Alton.....1921	9,420	4,234	13,654	4.7	.....	1,244	546	27.0	390	23.9	5,274	190	282,967	1,591,748
1920	2,606	8,767	11,373	2.4	.....	1,091	513	27.8	348	18.8	3,916	232	252,101	1,374,747
Chi., Burl. & Quincy....1921	50,420	16,120	66,540	13.1	1,888	1,522	711	27.9	477	27.2	3,405	163	1,487,635	9,545,599
1920	20,675	51,017	71,692	7.1	.....	1,497	738	27.6	537	27.4	4,135	196	1,373,680	9,003,974
Chi., Rock Isl. & Pacific..1921	31,901	16,887	48,788	10.6	9,870	1,128	467	22.9	376	25.5	2,395	179	1,301,586	7,383,079
1920	10,450	46,271	56,721	5.8	.....	1,042	470	23.9	343	20.4	2,548	...	1,240,135	7,359,210
Denver & Rio Grande....1921	13,347	2,066	15,413	10.9	3,511	1,236	594	27.1	213	11.4	1,268	231	228,839	1,675,796
1920	8,574	5,091	13,665	5.3	.....	1,064	549	29.0	280	13.4	1,482	...	225,446	1,631,593
Oregon Short Line.....1921	7,730	3,119	10,849	5.9	2,927	1,323	639	28.7	511	26.1	2,349	145	290,216	1,993,300
1920	3,761	6,025	9,786	2.7	.....	1,281	659	28.8	754	35.4	3,143	161	257,425	1,919,080
Southern Pacific.....1921	21,852	18,455	40,307	11.2	6,435	1,543	613	23.5	496	33.6	2,867	159	1,352,499	10,700,335
1920	12,528	28,638	41,166	3.7	.....	1,338	607	25.4	428	24.1	2,534	171	1,433,398	11,346,771
Union Pacific.....1921	19,897	7,309	27,206	22.1	7,842	1,656	732	23.2	595	34.9	4,475	162	836,063	6,829,544
1920	6,169	13,514	19,683	5.8	.....	1,281	608	24.4	905	48.0	4,932	194	820,914	7,018,574
Southwestern Region:														
Gal., Harrisb'g & S. An..1921	9,019	13,753	22,772	16.2	3,422	1,218	519	25.9	(1)	(1)	3,684	132	186,800	1,279,532
1920	2,428	21,327	23,755	4.9	.....	1,233	567	27.3	(1)	(1)	3,532	117	164,374	1,268,207
Gulf, Colo. & Santa Fe..1921	168	12,775	12,943	4.9	1,048	1,383	624	26.1	406	24.0	2,773	144	189,277	1,090,806
1920	114	15,564	15,678	6.5	.....	1,217	564	24.5	312	17.5	2,586	...	190,948	1,200,326
Missouri, Kans. & Tex..1921	9,261	4,525	13,786	7.9	1,463	1,432	585	23.2	311	21.7	2,503	148	264,337	1,936,469
1920	3,336	11,360	14,696	7.3	.....	1,340	553	23.5	341	23.2	2,929	...	296,120	2,069,816
Mo., Kans & Tex. of Tex.1921	367	12,051	12,418	4.5	1,175	1,185	476	24.5	268	18.9	1,914	156	267,302	1,674,326
1920	200	13,720	13,920	4.5	.....	1,020	441	24.6	273	17.2	2,187	...	302,346	1,889,043
Missouri Pacific.....1921	33,361	16,101	49,462	8.4	8,313	1,264	573	25.6	387	22.2	2,638	158	916,814	5,293,019
1920	11,177	44,167	55,344	3.4	.....	1,193	571	26.4	347	18.1	2,646	...	869,807	5,077,949
St. Louis-San Francisco..1921	21,357	9,855	31,212	7.0	.....	987	429	24.9	328	20.3	2,153	200	754,159	4,272,751
1920	9,305	29,570	38,875	5.0	.....	925	418	26.1	295	17.2	2,409	227	748,743	4,386,802
Texas & Pacific.....1921	6,136	5,468	11,604	18.5	.....	1,192	465	21.9	364	26.1	2,165	160	306,603	1,933,654
1920	2,893	13,004	15,897	8.5	.....	1,095	462	23.4	314	19.8	2,563	176	305,278	2,071,520

[1]Data not available. [2]No passenger train service.

Compiled by the Bureau of Statistics, Interstate Commerce Commission.

Equipment and Supplies

Car Deliveries—First Five Months of 1921

Freight car production is again returning to the low level which characterized the first half of 1920. Reports of the leading car building companies to the Railway Car Manufacturers Association show that in May there were produced for domestic service 3,610 freight cars. This compared with 4,455 in April and represents a progressive decline from the figure of 7,298 reached in December, 1920. The production for the first six months of 1920 averaged about 3,000 cars monthly.

The following table shows the production of freight and passenger cars by months from January 1, 1920, to May 31, 1921, by the car building companies which report their production to the Railway Car Manufacturers' Association.

TABLE I—CAR DELIVERIES

1920	Freight cars		Passenger cars	
	Domestic	Foreign	Domestic	Foreign
January	4,482	1,904	1	9
February	3,774	1,039	4	..
March	2,796	1,994	11	28
April	2,127	1,912	15	..
May	2,630	1,387	..	..
June	2,608	708	..	21
July	2,583	380	18	27
August	3,056	1,184	21	13
September	3,529	1,088	38	..
October	5,999	668	21	13
November	5,902	976	48	..
December	7,298	1,362	96	17
Total for 1920	46,784	14,602	273	135

1921	Freight cars		Passenger cars	
	Domestic	Foreign	Domestic	Foreign
January	7,008	819	43	..
February	6,276	500	50	14
March	5,753	700	69	..
April	4,455	871	116	..
May	3,610	429	138	6
5 mos. 1921	27,102	3,319	416	20

Other figures supplied by the Association show that in the greater part of the period under consideration the builders have been working on back orders. In other words, as small as the production was, it has been considerably ahead of the orders taken for new business. Thus at the end of August, 1920, there were on order and undelivered 50,275 freight cars for domestic service; at the end of May, 1921, the total had been decreased to but 13,890. The detailed figures follow:

TABLE II—CARS ON ORDER AND UNDELIVERED

(Figures for end of month)

	Freight Cars			Passenger Cars		
	Domestic	Foreign	Total	Domestic	Foreign	Total
December, 1919	24,816	10,720	35,536	407	110	517
January, 1920	27,282	9,381	36,663	311	103	414
February	29,706	8,389	38,095	282	103	385
March	33,061	7,854	41,455	522	80	602
April	42,869	7,180	50,049	586	88	674
May	47,761	6,338	54,099	732	110	842
June	48,171	7,792	55,963	796	97	893
July	50,275	8,212	58,487	811	88	899
August	49,442	7,574	57,016	861	75	936
September	48,114	6,793	54,907	903	75	978
October	46,051	7,026	53,077	851	66	917
November	41,290	6,234	47,524	925	59	984
December	35,268	4,856	40,124	829	42	871
January, 1921	32,874	2,903	35,777	786	42	828
February	26,685	3,225	29,910	750	28	778
March	21,808	4,029	25,837	681	28	709
April	17,513	3,312	20,825	565	24	589
May	13,890	3,559	17,449	450	18	468

Car repair work has been an important feature of the work of the car building companies for the past several months. The figures follow:

TABLE III—FREIGHT CAR REPAIRS

	Delivered during month	On order and undelivered at end of month
May, 1920	2,296	20,130
June	2,541	24,092
July	2,491	23,541
August	2,818	27,031
September	3,140	26,710
October	3,945	27,779
November	4,345	25,663
December	4,648	22,951
Total, Jan. 1, 1920, to Dec. 31, 1920	34,198	
January, 1921	4,229	21,469
February	4,499	18,303
March	4,824	14,348
April	3,898	11,884
May	3,250	12,308
5 mos.	20,700	

(Note. In using the above tables attention should be drawn to the fact that from March, 1921, on, one additional car building company is included. The figures now represent the production of all the important builders and, therefore, the larger part of the car building capacity of the country, with the exception of the railroad shops, the production of cars in which relatively to the total is not great.)

Locomotives

THE UNITED STATES OF COLOMBIA has ordered 4 locomotives from the Baldwin Locomotive Works.

THE ILLINOIS CENTRAL is asking for prices on the repairs of from 100 to 130 Mikado type locomotives.

THE SOROCABANA RAILWAY (Brazil) has ordered 2 Mikado type locomotives from the Baldwin Locomotive Works.

THE PITTSBURGH & WEST VIRGINIA has ordered 2 Pacific type locomotives from the American Locomotive Company.

THE NATIONAL RAILWAYS OF MEXICO have ordered 10 Pacific type locomotives from the Baldwin Locomotive Works.

THE HUNTINGDON & BROAD TOP MOUNTAIN RAILROAD has ordered 4 locomotives from the Baldwin Locomotive Works.

THE LEHIGH & HUDSON RIVER is having repairs made to 2 locomotives at the shop of the Baldwin Locomotive Works.

THE MONTEREY IRON & STEEL COMPANY, Mexico, has ordered from the American Locomotive Company, 4 Consolidation type locomotives, with a total weight in working order of 294,000 lb.

THE PEKIN-KALGAN (China) has ordered from the American Locomotive Company, 3 Pacific type locomotives with a total weight in working order of 292,000 lb. and 2 Mikado type locomotives, with a total weight in working order of 296,000 lb.

THE NATIONAL RAILWAYS OF MEXICO have ordered from the American Locomotive Company, 20 Consolidation type locomotives with a total weight in working order of 314,000 lb. and 7 Mikado type locomotives, with a total weight in working order of 440,000 lb.

Freight Cars

THE NORTHERN PACIFIC is inquiring for prices on 1,000 steel center constructions for freight car repairs.

THE WABASH has given an order to the Western Steel Car & Foundry Company for making repairs to 300 steel hopper cars of 40 tons' capacity.

THE AMERICAN REFRIGERATOR TRANSIT COMPANY, St. Louis, Mo., has ordered 100 steel underframes from the General American Tank Car Corporation.

Passenger Cars

THE HUNTINGDON & BROAD TOP MOUNTAIN RAILROAD has ordered 10 passenger cars from the Harlan plant of the Bethlehem Shipbuilding Corporation, Ltd.

Iron and Steel

THE KANAWHA & MICHIGAN is inquiring for bids on 700 to 800 tons of structural steel for bridge work.

THE WHEELING & LAKE ERIE is inquiring for 150 tons of steel for car repairs and 200 kegs of spikes.

THE CHESAPEAKE & OHIO has ordered 1,700 tons of bridge material from the Mount Vernon Bridge Company.

Signaling

THE MISSOURI, KANSAS & TEXAS has ordered from the Union Switch & Signal Company 63 semaphore signals to be installed between La Bette, Kan., and Vinita, Okla.

Supply Trade News

Charles Copeland, assistant treasurer of **E. I. du Pont de Nemours & Co., Inc.,** Wilmington, Del., has been elected secretary, to succeed Alexis I. du Pont, deceased.

The **Jeffrey Manufacturing Company,** Columbus, Ohio, on June 1, removed its New York City office, from 50 Dey street to 30 Church street, with **Harold B. Wood** as district manager.

N. C. Catabish, general sales manager of the **National Carbon Company, Inc.,** Cleveland, Ohio, has been assigned to other duties and **J. R. Crawford,** general sales manager of the Union Carbide Sales Company, has been appointed to succeed Mr. Catabish.

American Car & Foundry Company

The annual report of the American Car & Foundry Company for the fiscal year ended April 30, 1921, shows earnings from all sources, after provision for taxes, of $13,212,816, as compared with $14,382,565 in the year ended April 30, 1920. A total of $4,661,961 was expended for renewals, replacements, etc., leaving net earnings of $8,550,856, as compared with $10,401,192 in 1920. Dividends were paid amounting to $2,100,000, or 7 per cent on the preferred stock, and $3,600,000, or 12 per cent on the common stock. The surplus for the year was $2,850,856, as compared with $1,101,192 for 1920. The profits for the year equal $21.50 a share on the common stock, as compared with $27.67 a share in the previous fiscal year.

President W. H. Woodin in his report to the stockholders says in part:

The present condition and future prospects of the railroads continue as causes of grave anxiety. It is unnecessary to dwell on the effects of governmental control and operation upon their financial and physical conditions. The question pressing for solution is their rehabilitation so that they may perform efficiently their proper functions in serving the industries of the country and that the vast amount of the people's money invested in their securities may be properly safeguarded. Because of lack of traffic, the increase in freight rates granted during the year just past has not as yet had any appreciable effect towards restoring a condition of prosperity. Undoubtedly a crying need is a reduction in the costs of operation, and some progress has been made in this direction by the recent ruling of the Railroad Labor Board. More than this, however, is required for their complete rehabilitation and relief. Particularly a backward step will be taken if the roads now shall be deprived of the benefit of the increase in freight rates recently granted them. This certainly should not be attempted until after a fair trial has been given the conditions brought about by the increase in rates and the reduction in operating costs.

During the year there has been but little buying of new equipment. This has been due in part to inability to finance purchases. Some relief has been given by the operation of the law of last year by which the government has been able to assist the roads in their buying—but compared to their requirements the measure of this relief has been almost negligible. The financing by the roads of the large amount of new equipment purchases that will be needed in the near future and without which the country's progress and prosperity will be greatly retarded, presents a problem. That from time to time a greater or less number of cars stand idle does not argue that the roads have all the equipment needed. It happens at the present time and due to general business depression, that there is a dearth of traffic to be moved. Notwithstanding this, the ratio of cars now idle to the total available for service is inconsiderable—and as soon as conditions once more approximate the normal the lack of equipment will be very much in evidence. While, therefore, this company in common with like industries confronts the likelihood of a lessening of its activities for some time to come, nevertheless this can be faced with equanimity in the certainty that the needs of the country will make imperative in the near future the resumption of equipment buying on a large scale.

During the year there have been brought to complete adjustment and in entire harmony all of the company's manufacturing accounts with the government, including those relating to the purchase by the director general of railroads of the 31,000 freight cars referred to in prior reports.

Due to the bad condition into which the equipment of many of the roads was allowed to fall while under government control, it was expected that there would be a very large amount of car repairing to be done. The result, however, has fallen far short of the expectation—such work accounting for approximately only one-fifth of the company's business and profits for the year. The manufacture and sale of its miscellaneous products has yielded a greater volume of business than has the work of car repairing. . . . .

The company enters upon its new year with a thoroughly liquidated inventory and a comfortable volume of business booked—approximately $30,000,000. In all respects its affairs are in satisfactory shape.

The balance sheet follows:

Assets		
Property and plant account		$71,875,643
April 30, 1920, as per last annual statement	$68,517,847	
Add: Additions during year	3,357,796	
Current assets		64,787,515
Materials on hand	$14,010,061	
Accounts and notes receivable	28,301,833	
U. S. certificates of indebtedness, Liberty Bonds and Victory Notes	5,008,850	
Stocks and bonds of other companies	5,992,332	
Cash in banks and on hand	11,474,439	
		$136,663,158
Liabilities		
Preferred stock		30,000,000
Common capital stock		30,000,000
Current liabilities		27,243,005
Accounts payable, not due, and payrolls (paid May 10, 1921)	$21,694,593	
Provision for federal taxes	4,123,412	
Dividend on preferred stock (payable July 1, 1921)	525,000	
Dividend on common capital stock (payable July 1, 1921)	900,000	
Reserve accounts		$14,143,585
For insurance	$1,500,000	
For general overhauling, improvements and maintenance	1,586,721	
Dividends on common capital stock, to be paid when and as declared by board of directors	10,800,000	
For improving working conditions of employees	256,864	
Surplus account		$35,276,568
		$136,663,158

Obituary

Edward J. Ronan, representative of the Gold Car Heating & Lighting Company, Brooklyn, N. Y., died at his home in Brooklyn on July 3. Mr. Ronan had been connected with the company for 21 years.

Alexander H. Handlan, president of the Handlan-Buck Manufacturing Company, St. Louis, who died at Oconomowoc, Wis., on May 28 after more than a year of ill-health, had spent his entire business career of 52 years in the service of that firm. In January, 1869, he was employed as a bookkeeper by M. M. Buck, a dealer in railroad lanterns at St. Louis, and shortly after bought an interest in the firm. In 1901 Mr. Handlan acquired the entire ownership of the company by purchase and changed the name of the concern to its present form. The business of the company was also expanded to permit the manufacturing of a line of railroad supplies. Mr. Handlan, at the time of his death, was not actively engaged in the management of his company, having retired from business about 20 years ago.

A. H. Handlan

Railway Construction

ALABAMA, FLORIDA & GULF.—The Interstate Commerce Commission has issued a certificate authorizing the construction of lines between Dothan and Wilson, Ala., four miles, and between Greenwood and Marianna, Fla., nine miles.

CHICAGO UNION STATION.—This company has let a contract to the Brennan Construction Company, Chicago, for the construction of a 12-duct conduit line between Harrison and Van Buren streets, noted in the *Railway Age* of July 2 (page 42); also a contract to the W. J. Newman Company for a temporary office building to be used in connection with the wrecking of the old Chicago & Alton freight house at Van Buren street.

ILLINOIS CENTRAL.—This company is accepting bids for the construction of the substructure of a bridge south of Johnston, Miss., to cost about $30,000.

ILLINOIS CENTRAL.—This company, which was noted in the *Railway Age* of June 17 (page 1422) as contemplating the construction of a pumping station at Ramsey, Ill., has closed bids for this work. This company is also receiving bids for the construction of a new water-treating plant at Amboy, Ill., to cost about $30,000.

MISSISSIPPI WARRIOR BARGE LINE.—This company has commenced construction of the new floating freight terminal at Cairo, Ill., to provide for the direct transfer of freight in the Illinois Central and the Mississippi Warrior Line.

PENNSYLVANIA SYSTEM.—This company has awarded a contract for the dismantling of its train shed at Jersey City, N. J., to Henry A. Hitner's Sons Company, Philadelphia, Pa. It is intended to replace this old structure with three low shelter sheds to take care of the passenger business which has been of a local character since the construction of the Pennsylvania terminal in New York City.

SOUTHERN PACIFIC.—This company has awarded a contract for the construction of a tunnel, 1,420 ft. long, eliminating the trestle on the west bank of the Willamette river, about 7 miles from Portland, Ore., to the Hauser Construction Company, Portland.

TEXAS & PACIFIC.—This company is accepting bids for the construction of a new brick and tile passenger station at Ranger, Tex., with dimensions of 42 ft. by 263 ft., to cost about $75,000.

THE PITTSBURGH & WEST VIRGINIA.—This company has let a contract to the John F. Casey Company, Pittsburgh, Pa., for the grading of 3½ miles of track into the coal fields owned by John A. Bell, of Pittsburgh. The work includes one 70-ft. steel bridge.

TOLEDO, PEORIA & WESTERN.—This company has awarded a contract to the Ogle Construction Company, Chicago, for the construction of a 100-ton frame coaling station at Cuba, Ill.

VIRGINIAN.—This company is receiving bids for the construction of additions to its shops at Elmore, W. Va.

WOOD CONSTRUCTION INFORMATION SERVICE.—The National Lumber Manufacturers Association, Chicago, has recently issued some additional data dealing with mill construction. The subjects treated in these sheets deal with basement floors, roof and roof coverings and include a set of floor beam charts to facilitate the determination of the most economical system of floor construction to carry a given load. Another subject presented is a progress report of tests made by the Forest Products Laboratory, Madison, Wis., in co-operation with the association on built-up beams under various loads in comparison with solid timbers.

ABOUT 2,000 SHOPMEN of the Delaware & Hudson resumed work on July 5, after a general suspension of work lasting six weeks. Certain shops on the Baltimore & Ohio on the same day took back about 3,600 shopmen who had been furloughed for three weeks or more. It is said that at the Mount Claire shops of the Baltimore & Ohio, in Baltimore, the forces now aggregate about two-thirds the normal number.

Railway Financial News

ANN ARBOR.—*Authorized to Issue Bonds.*—The Interstate Commerce Commission has authorized an issue of $2,000,000 of 6 per cent bonds under the company's improvement and extension mortgage, $1,925,000 of the bonds to be pledged as collateral security for certain promissory notes and $75,000 to be issued in exchange for 5 per cent bonds now held in the treasury.

ATLANTIC COAST LINE.—*Annual Report.*—A review of this company's annual report for 1920 appears on another page of this issue.

CHICAGO & ALTON.—*Annual Report.*—The income account for the year ended December 31, 1920, compares with the previous year as follows:

	1920	1919
Operating revenues (March 1-December 31)	$25,785,052	.....
Operating expenses (March 1-December 31)	24,403,890	.....
Revenues over expenses (March 1-December 31)	$1,381,162	.....
Rental from United States Railroad Administration	529,719	$3,178,315
United States Government guaranty period claim	3,105,524	.....
Railway operating income	$5,016,405	$3,178,315
Operating expenses, corporate, not assumed by the United States Railroad Administration	$9,573	$64,192
Taxes	657,144	4,787
Railway operating income over corporate expenses and taxes	$4,349,688	$3,109,336
Total income from railroad properties	$4,412,748	$3,101,409
Deductions:		
Hire of equipment, etc.	$1,056,888	$271,053
Net income from railroad properties	3,355,860	2,830,356
Total other income	$119,256	$105,825
Total income from all sources	$3,475,116	$2,936,181
Deductions:		
Interest on funded debt, etc.	$4,109,763	$3,933,650
Net deficit	634,647	997,469

The annual report of the Chicago & Alton will be reviewed editorially in an early issue.

GREAT NORTHERN.—*Asks Loan for New Equipment.*—Application has been filed with the Interstate Commerce Commission for a loan of $606,000 from the revolving fund to aid in the purchase of 500 refrigerator cars, and authority was also asked for the issuance of $606,000 of equipment gold notes at 6½ per cent which it is proposed to sell at 97½ to the First National Bank of New York.

ILLINOIS CENTRAL.—*Annual Report.*—A review of this company's annual report for 1920 appears on another page of this issue.

INTERSTATE RAILROAD.—*Authorized to Issue Stock.*—This company has been authorized by the Interstate Commerce Commission to issue $3,000,000 of additional stock, the proceeds to be used for the purchase of property for and the construction of an extension of its railway from the present terminus at Norton, Va., to a connection with the Carolina, Clinchfield & Ohio, a distance of about 25 miles. The right of way of the Norton & Northern to be purchased will constitute a portion of the completed extension.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—*Authorized to Purchase Road.*—This company has been authorized by the Interstate Commerce Commission to acquire the railroad property of the Wisconsin & Northern and to issue $2,671,000 of its first consolidated 5 per cent mortgage bonds to be used in part payment.

MINNEAPOLIS & ST. LOUIS.—*Authorized to Issue Bonds.*—The Interstate Commerce Commission has authorized an issue of $714,000 of refunding and extension mortgage 5 per cent bonds to be placed in the company's treasury in respect of expenditures for additions and betterments amounting to $398,000 and for retirement of equipment obligations amounting to $316,000.

MINNEAPOLIS & ST. LOUIS.—*Annual Report.*—The corporate

income account for the year ended December 31, 1920, compares with the previous year as follows:

	1920	1919
Operating revenues	$14,352,998	.....
Operating expenses	14,923,309	.....
Taxes (other than U. S. Government)	568,623	.....
Total	$15,491,932	.....
Operating revenues over expenses and taxes	Def. $1,138,934	.....
Standard return	$451,438	$2,773,857
Amount by which M. & St. L. R. R. failed to earn Govt. Guaranty (March to August) estimated	3,362,819	.....
Total income, including other	$4,055,806	$3,058,508
Surplus	$2,916,872	$3,058,508
Interest on outstanding funded debt	$2,079,218	$2,040,479
Taxes—U. S. Government	53,257	17,416
Total fixed and other charges	$2,316,696	$2,627,815
Balance—Surplus	$600,176	$430,693

The annual report of the Minneapolis & St. Louis will be reviewed editorially in an early issue.

MISSOURI, KANSAS & TEXAS.—*Application for Loan Approved.*—The Interstate Commerce Commission has approved a loan of $450,000 to the receiver to assist in the acquisition of 300 50-ton steel tank cars of 10,000 gal. capacity, to cost $3,007 each.

SEABOARD AIR LINE.—*Defers Interest on Bonds.*—The directors on July 1 voted to defer the semi-annual interest payment due August 1 on the $25,000,000 5 per cent adjustment mortgage bonds, the principal of which is due October 1, 1949. The bonds were issued on October 1, 1909.

Robert L. Nutt, treasurer of the Seaboard Air Line, made the following statement after the meeting:

> The directors under ordinary conditions might have considered an advancement of the necessary amount, although not earned, but since the interest is cumulative and because of general depressed business conditions throughout the country, in the opinion of the board, the company would not be justified in advancing interest on the income bonds, which would take from the property money considered essential to is proper maintenance. A further consideration was the fact that the reduction of wages does not take effect until after July 1.
>
> The policy of the company during the succeeding six months will be to put the motive power in first class condition to meet the winter business of the corporation. This policy will, it is believed by the board, prove to the material benefit of the adjustment bondholders in that their property will be better conserved.
>
> The amount earned during the period under consideration, viz., November 1 last to April 30, 1921, available for interest on the adjustment bonds was approximately $30,000. This will be carried over into the next interest period, the amount being insufficient to justify its distribution.

SOUTHERN PACIFIC.—*Annual Report.*—A review of this company's annual report for 1920 appears on another page of this issue.

SUGAR PINE.—*Asks Permission to Abandon Line.*—This company has applied to the Interstate Commerce Commission for a certificate authorizing the abandonment of its line of 14.15 miles in Tuolumne County, Cal.

TENNESSEE CENTRAL.—*Sale Postponed.*—The sale of this road, scheduled for June 30, has been postponed to October 1, at the request of the Mississippi Valley Trust Company, trustee for the first mortgage bondholders.

TEXAS CITY TERMINAL.—*Certificate Held Not Necessary.*—The Interstate Commerce Commission has issued a decision that the proposed acquisition and operation by this company of the railroad formerly owned by the Texas City Transportation Company and operated by the Terminal Company as lessee, is not within the scope of Paragraph 18, Section 1, of the interstate commerce act, and the proceeding was dismissed.

TOLEDO, ST. LOUIS & WESTERN.—*Annual Report.*—The corporate income account for the year ended December 31, 1920, compares with the previous year as follows:

	1920	1919
Operating revenues:		
Freight	$9,307,528	.....
Passenger	400,925	.....
Total	$10,118,447	.....
Operating expenses:		
Maintenance of way and structures	$2,124,597	.....
Maintenance of equipment	2,019,174	.....
Traffic	164,459	.....
Transportation	3,657,763	.....
General	179,450	.....
Total	$8,144,957	.....
Net revenue from operations	$1,973,490	.....
Tax accruals	288,150	.....
Railway operating income	$1,685,172	.....
Total other income	779,795	$1,273,316
Gross income	2,464,967	1,273,316
*Deductions from total gross income including interest on funded debt	1,146,228	1,087,653
Total	$2,103,491	$1,368,749
Net income	361,476	Def. 95,433

*Includes interest on A and B Gold Bonds of 1917, amounting to $461,080 defaulted.

The operating revenues and expenses in detail and the principal traffic statistics for 1920 compare as follows:

	1920	1919
Operating Revenues		
Freight	$10,766,900	$7,419,636
Passenger	461,017	452,377
Total operating revenues	$11,758,721	$8,267,878
Operating Expenses		
Maintenance of way and structures	$2,317,092	$1,475,281
Maintenance of equipment	2,371,601	1,821,103
Traffic expenses	178,056	72,625
Transportation expenses	4,425,344	3,440,980
General expenses	201,312	137,569
Total operating expenses	$9,492,917	$6,944,945
Net revenue from railway operations	2,265,804	1,322,932
Railway tax accruals	350,150	315,000
Railway operating income	$1,915,192	$1,007,801
Freight Traffic		
Number of tons carried	5,082,141	4,123,391
Number of tons carried one mile	1,261,496,000	896,804,000
Average distance hauled per ton (miles)	248.23	217.23
Average revenue per ton mile	$.00854	$.00827
Passenger Traffic		
Number of passengers carried	319,619	295,166
Number of passengers carried one mile	15,347,648	18,447,764
Average distance hauled per passenger (mile)	48.02	62.50
Average revenue per passenger mile	$.03004	$.02455

W. L. Ross, receiver, in his remarks, says that the results of the operation of the property for the year show the largest operating revenues in the history of the road, there being an increase of $3,490,843, or 42.22 per cent over the preceding year, regardless of the disturbed business and financial condition of the country.

WHEELING & LAKE ERIE.—*Authorized to Issue Equipment Obligations.*—This company has been authorized by the Interstate Commerce Commission to issue short term notes to the amount of $13,629,000 for the acquisition of equipment through the National Railway Service Corporation's equipment trust agreement; to assume obligation as endorser and guarantor in respect of obligations of the service corporation to the United States, to the amount of $3,304,000, and to pledge with the Secretary of the Treasury $779,000 of refunding mortgage 5 per cent bonds to secure the repayment of a loan of $3,304,000.

Guaranty Certificates Issued

The Interstate Commerce Commission has issued certificates for partial guaranty payments, as follows:

Erie	$1,000,000
Fernwood, Columbia & Gulf	18,000
Middletown & Unionville	35,000
New Orleans Great Northern	130,000
St. Johnsbury & Lake Champlain	70,000
Winston-Salem Southbound	10,000
Trinity Valley	1,500
Susquehanna & New York	50,000
Manistique & Lake Superior	33,000
Flint River & Northwestern	4,000
Chicago Great Western	150,000

Dividends Declared

Ashland Coal & Iron Ry.—1 per cent, quarterly, payable June 25 to holders of record June 25.

Atlanta & West Point—3 per cent, payable June 30, to holders of record June 21.

Belt Railroad & Stock Yards (Indianapolis)—Common, 3 per cent quarterly; preferred, 1½ per cent; both payable July 1.

Delaware, Lackawanna & Western—5 per cent, quarterly, payable July 20 to holders of record July 11.

Georgia Railroad & Banking—3 per cent, quarterly, payable July 15 to holders of record July 1.

Manhattan Railway—1¾ per cent quarterly, payable July 1 to holders of record June 30.

Pittsburgh & West Virginia—Preferred, 1½ per cent, quarterly, payable August 31 to holders of record August 1.

Richmond, Fredericksburg & Potomac—Common and dividend obligations, 4½ per cent, payable June 30 to holders of record June 24.

Western Ry. of Alabama—3 per cent, payable June 30 to holders of record June 30.

Annual Report

Illinois Central Railroad Company — Seventy-First Annual Report

TO THE STOCKHOLDERS OF THE ILLINOIS CENTRAL RAILROAD COMPANY:

There is submitted herewith the report of the Board of Directors covering the affairs of your company for the year ended December 31, 1920.

The number of miles operated on December 31, 1920, was....		4,799.40
Additions for year:		
January 1, 1920—Tracks of New Orleans Great Northern R. R. at Monticello, Miss., not reported in previous years	.36	
December 1, 1920—Rechaining at Tara, Ia.....	.02	.38
		4,800.15
Less:		
February 1, 1920—Reduction due to construction of cut-off at Scottsburg, Ky.....	.62	
February 1, 1920—Shortening line at Carbondale, Ill.....	.10	
March 1, 1920—Shortening line due to construction of cut-off at Camp Knox, Ky.....	.03	.75
The number of miles operated on December 31, 1920, was.....		4,799.40
The average number of miles of road operated during the year was		4,799.44

INCOME

A summary of the Corporate Income for the year ended December 31, 1920, compared with the Corporate Income for the year 1919, is stated below.

	1920	1919	Increase + Decrease —
Average Miles Operated During Year	4,799.44	4,793.22	+ 6.22
Operating Revenues	$121,804,579.25	.....	+$121,804,579.25
Operating Expenses.....	121,874,327.47	.....	+ 121,874,327.47
Expenses over Revenues.	69,748.22	.....	+ 69,748.22
United States Government —Guaranty Period Claim	19,499,886.56	.....	+ 19,499,886.56
Rental from United States Railroad Administration..	3,399,634.99	$17,896,467.48	— 14,496,832.49
Railway Operating Income	22,829,773.33	17,896,467.48	+ 4,933,305.85
Operating Expenses, Corporate, not assumed by United States Railroad Administration	117,657.90	351,632.62	— 233,974.72
Federal War Income and Other Taxes	7,172,261.96	853,200.00	+ 6,319,061.96
Uncollectible Railway Revenues	23,319.80	.....	+ 23,319.80
Railway Operating Income over Corporate Expenses, Taxes and Uncollectible Railway Revenues	15,516,533.67	16,691,634.86	— 1,175,101.19
Equipment Rents—Net Credit	3,196,849.02	.....	+ 3,196,849.02
Joint Facility Rents—Net Debit	191,297.36	.....	+ 191,297.36
Net Railway Operating Income	18,522,085.33	16,691,634.86	+ 1,830,450.47
Income from Investments and Other Corporate Income	7,219,881.91	7,634,004.57	— 414,122.66
Gross Income	25,741,967.24	24,325,639.43	+ 1,416,327.81
Interest on Funded Debt and Other Miscellaneous Corporate Charges	12,170,844.96	12,156,719.96	+ 14,125.00
Net Income	13,571,122.28	12,168,919.47	+ 1,402,202.81
Disposition of Net Income:			
Income Applied to Sinking and Other Reserve Funds	118,200.00	118,200.00	.....
Income Appropriated for Investment in Physical Property	18,080.85	170,100.07	— 152,019.22
Total Appropriations of Income	136,280.85	288,300.07	— 152,019.22
Income Balance Transferred to Credit of Profit and Loss.....	13,434,841.43	11,880,619.40	+ 1,554,222.03

The income account for the current year 1920 consists of the Federal contract compensation for January and February, less Corporate expenses and war taxes; and the income resulting from operation for the ten months beginning March 1, 1920. To these sums is added an amount which represents the difference between the amount earned and the amount guaranteed under Section 209 of the Transportation Act, 1920, during the six months' guaranty period, from March 1 to August 31, 1920, inclusive, which amount stands as a claim against the Government. For the year 1919 the income account was made up of compensation accrued to your Company under the contract with the Government entered into pursuant to the Federal Control Act, from which were deducted Corporate expenses and Federal war taxes. To the income for the respective years was added income from securities owned and other Corporate income and there was deducted interest on funded debt and other Corporate charges.

In the current year's income the items "Operating Revenues," amounting to $121,804,579.25, and "Operating Expenses," amounting to $121,874,327.47, represent operating results for the months from March to December, 1920, inclusive. There were no corresponding figures for the previous year because in that year all operating revenues accrued to and all operating expenses were borne by the Government and in lieu thereof there accrued to your Company rental payable by the Government under the terms of the Federal Control Act and the standard form of contract entered into by your Company with the Director General of Railroads.

The item "United States Government-Guaranty Period Claim" of $19,499,886.56 is the sum by which the Railway Operating Income, as defined in Section 209 of the Transportation Act, 1920, for the six months from March 1 to August 31, 1920. was insufficient to meet the guaranty under this section of the Act.

The decrease of $14,496,832.49 in "Rental from United States Railroad Administration" for the year 1920, compared with the year 1919, is due to the fact that rental payable under the Federal Control Act and the Standard Contract accrued for January and February of the current year only, while in the year 1919, the rent for the entire year accrued to your Company.

There was a decrease of $233,974.72 in "Operating Expenses, Corporate, not assumed by United States Railroad Administration" for the reason that Federal control terminated March 1, 1920, and similar expenses for the remaining ten months were included in "Operating Expenses." In the previous year the expenses for the entire twelve months were included in this account. These expenses were for salaries and expenses of officers and clerks necessary to maintain the Corporate organization.

The increase of $6,319,061.96 in "Federal War Income and Other Taxes" is principally due to the inclusion in the current year of ten months of State and other taxes accruing from March to December, 1920, in addition to Federal war income taxes for the year. The state and other taxes for the first two months of the year 1920 were chargeable to the Director General of Railroads. In the previous year the Company assumed the Federal war income taxes and the State and other taxes for the entire year were borne by the Director General of Railroads.

The increase of $23,319.80 for the calendar year 1920 in the item "Uncollectible Railway Revenues" was for transportation charges earned by your Company determined to be uncollectible and therefore charged off. Uncollectible railway revenues in the previous year were included in the accounts of the Director General of Railroads and any portion thereof antedating the Federal control period was charged back to your Company by the Director General and in the report of the previous year included in "Expenses Prior to January 1, 1918."

The increase of $3,196,849.02 for "Equipment Rents-Net Credit" is the excess of income over outgo for hire of railway equipment for the last ten months of the current year. In the previous year, as also in the months of January and February, 1920, this income accrued to the Director General of Railroads under the terms of the Federal Control Act and the Standard Contract.

The increase of $191,297.36 in "Joint Facility Rents-Net Debit" is for the excess of rentals paid over rentals received for tracks and terminal facilities used in common with other carriers for the last ten months of the year. The corresponding rentals for the first two months of the current year and for the previous year accrued to or were assumed by the Director General of Railroads.

"Income from Investments and Other Corporate Income" decreased $414,122.66. There was a decrease of $1,005,858.53 in the amount of interest receivable on Louisville, New Orleans & Texas Railway Company Second Mortgage Income Bonds and a decrease of $126,382.06 compared with the previous year, caused by a reduction in the amount of revenues accrued prior to January 1, 1918, being reported by the Director General of Railroads. These decreases were offset in part by an increase of $150,006.38 in dividends from securities owned, representing an increase of $400,000.00 in dividends on Madison Coal Corporation stock, less decrease of $249,993.62 on account of dividends received on Dubuque & Sioux City Railroad Company capital stock last year and on which no dividends were paid during the current year. There was also an increase of $564,219.03 in "Income from Unfunded Securities and Accounts," the major portion of which was for interest receivable from The Yazoo and Mississippi Valley Railroad Company on its unfunded indebtedness to your Company. The balance of the increase $3,892.52 consisted of minor items of nonoperating income received this year as compared with the previous year.

The increase of $14,125.00 in "Interest on Funded Debt and Other Miscellaneous Corporate Charges" is largely due to an increase in interest on funded debt, less a substantial decrease in rents for leased roads. The increase in interest on funded debt was on account of additional securities issued during the year for new equipment. The decrease in rents for leased roads represents the deficit from operations of the Dubuque & Sioux City Railroad by your Company during the last four months of the current year and is payable by the Dubuque & Sioux City Railroad Company.

ASSETS AND LIABILITIES

The following is an explanation of the important changes in "Investments" and "Funded Debt" during the year:

Investments:

Expenditures for additions and betterments amounted to $17,295,942.82, as shown in detail on page 8. Of this sum $15,191,281.07 was for improvements to lines of railroad owned by your company and to its equipment and is included in General Balance Sheet Account "Road and Equipment since June 30, 1907." The balance of $2,104,661.75 covered improvements to the railroads of subsidiary companies and is included in General Balance Sheet Account "Investments in Affiliated Companies—Advances."

The increase of $196,500.00 in "Investments in Affiliated Companies—Bonds" was as follows:

Purchase of Ocean Steamship Company of Savannah Seven Per Cent Gold Bonds of 1925, at par.....		$209,000.00
Less: Feoria & Pekin Union Railway Company Five Per Cent Debenture Bonds matured August 1, 1920, redeemed, par value		12,500.00
Increase		$196,500.00

There was an increase of $2,044,172.66 in "Investments in Affiliated Companies—Advances," as shown in Table 6, representing advances to subsidiary companies, as follows:

Advances for additions and betterments to the lines of railroad and equipment of subsidiary companies.....		$2,104,661.75
Less: Reduction in advances to non-transportation subsidiary companies		60,489.09
Increase		$2,044,172.66

There was an increase of $2,088,900.00 in "Other Investments—Bonds" explained as follows:

The Yazoo and Mississippi Valley Railroad Company Registered Five Per Cent Gold Improvement Bonds.....		$2,614,000.00
These bonds were transferred from the Insurance and Pension Funds closed during the year.		
Less: Sale of United States Fourth Liberty Loan Four and One-Quarter Per Cent Bonds sold to Central of Georgia Railway Company $525,000.00		
Homewood Country Club First Mortgage Five Per Cent Bonds, redeemed.....	100.00	525,100.00
Increase		$2,088,900.00

Funded Debt:

There was an increase in "Funded Debt" of $18,911,085.00, as follows:

Illinois Central Railroad Company Six Per Cent Equipment Gold Notes issued under Government Equipment Trust No. 33		$9,117,000.00
Illinois Central Equipment Trust, Series "F," Seven Per Cent Certificates issued		8,107,000.00
Illinois Central Railroad Company One to Fifteen Year Secured Six Per Cent Notes issued		4,440,000.00
Illinois Central Railroad Company and Chicago, St. Louis & New Orleans Railroad Company Joint First Refunding Mortgage Five Per Cent Bonds, Series "A," issued for conversion of Sterling Bonds in Dollar Bonds		5,085.00
Total		$21,669,085.00
Less:		
Equipment trust obligations retired and cancelled:		
Illinois Central Railroad Company Equipment Trusts:		
Series "A"	$800,000.00	
Series "B"	350,000.00	
Series "C"	198,000.00	
Series "D"	190,000.00	
Series "E"	550,000.00	
Chicago, St. Louis & New Orleans Railroad Company Equipment Trust, Series "A"	570,000.00	
	$2,658,000.00	
Real Estate Mortgage matured and paid	100,000.00	$2,758,000.00
Net Increase		$18,911,085.00

"Funded Debt Held in Treasury" decreased $70,000.00 due to the retirement of a like amount of matured Chicago, St. Louis & New Orleans Railroad Company Equipment Trust, Series "A" Bonds.

Additions and Betterments—Expenditures:

There was expended during the year for Additions and Betterments (including improvements on subsidiary properties), $17,295,942.82.

Road	Additions and Betterments on Owned Lines	Advances for Additions and Betterments to Lines of Subsidiary Companies	Total Expended
Total	$3,671,844.12	$1,999,235.79	$5,671,079.91
Equipment:			
Steam locomotives	$1,801,316.47	.....	$1,801,316.47
Freight train cars	9,656,447.03	.....	9,656,447.03
Passenger train cars	Cr. *9,721.18*	..... Cr.	*9,721.18*
Floating equipment	Cr. *2,000.00*	..... Cr.	*2,000.00*
Work equipment	49,353.74	.....	49,353.74
Miscellaneous equipment	1,894.63	.....	1,894.63
Total	$11,497,290.69	.....	$11,497,290.69
General:			
Organization expenses	.....	$15.66	$15.66
General officers and clerks	.....	2,361.52	2,361.52
Law	.....	4,263.49	4,263.49
Taxes	$336.63	41.73	378.36
Interest during construction	21,809.63	98,743.56	120,553.19
Total	$22,146.26	$105,425.96	$127,572.22
Grand Total	$15,191,281.07	$2,104,661.75	$17,295,942.82

The following shows the amount advanced during the year to each of the subsidiary companies, these amounts being included in total advances shown in Table No. 6 of this report:

Benton Southern R. R. Co.		$82.36
Bloomington Southern R. R. Co.	Cr.	*612.00*
Blue Island R. R. Co.		1,708.57
Canton, Aberdeen & Nashville R. R. Co.		23,321.09
Chicago, St. Louis & New Orleans R. R. Co.		1,340,047.05
Dubuque & Sioux City R. R. Co.		467,600.66
Fredonia & Reeds R. R. Co.		6,228.61
Golconda Northern Ry.		213,718.71
Kensington & Eastern R. R. Co.		55,374.16
Memphis R. R. Terminal Co.	Cr.	*6,000.00*
South Chicago R. R. Co.		3,192.54
Total		$2,104,661.75

ROAD AND EQUIPMENT

The following is a summary of the more important improvements during the year, the cost of which was charged wholly or in part to Road and Equipment.

Additions and Betterments—Road:

136 new industrial sidings were built or extended.

137 new company sidings were built or extended, a net addition of 18.33 miles. Included therein were additions to yard facilities of 5.03 miles at Freeport, Ill., 2 miles at Centralia, Ill., and 1.70 miles at Nonconnah, Tenn.

The grading for the Markham Yard, located between Harvey, Ill., and Homewood, Ill., referred to in the report of the previous year, was continued.

Second main track was constructed from Amboy, Ill., to Sublette, Ill., 5.79 miles, and from Heyworth, Ill., to Clinton, Ill., 8.66 miles. There were constructed during the year 12.53 miles of third main track between Peotone, Ill., and Tucker, Ill.

That portion of the line change and grade reduction work between Dawson Springs, Ky., and Scottsburg, Ky., known as the Scottsburg Grade Reduction, was completed.

The 56th St. subway, Chicago, Ill., was finished. This completed the renewal of bridges over streets between 51st St. and 67th St., Chicago, Ill. The construction of the new St. Charles Air Line bridge over the south branch of the Chicago river was completed and the old structure retired. The bridge over the Rock river at Dixon, Ill., was replaced with a new structure during the year in order to permit the operation of new Central type locomotives on the Amboy District.

The construction of subway at Washington Street, Bloomington, Ill., and two subways at Lemp and 14th Streets, Ft. Dodge, Iowa, was commenced.

The interlocking plant at Bemis, Tenn., referred to in the previous report, was completed.

The suburban platforms with waiting rooms at track level, at Chicago, Ill., between 51st and 53rd Streets, 56th and 57th Streets, and 59th and 60th Streets; suburban stations at street level at 51st, 53rd, 56th, 57th, 59th and 60th Streets; also, interchange facilities for the Chicago, Lake Shore and South Bend Railway at Kensington, Chicago, Ill., referred to in the previous report, were completed. A suburban station was constructed at 175th Street, south of Chicago, Ill., to serve the Calumet Country Club. A new passenger station and a new freight station with power house and track facilities were constructed at Centralia, Ill. A new freight and passenger station was constructed at Newbern, Tenn.

New icing facilities were constructed at Jackson, Miss., and improvements made to the ice house at Waterloo, Iowa.

Improvements were made in water facilities at Kankakee, Ill., Hart, Ill., Centralia, Ill., Peotone, Ill., and New Orleans, La. A new 100,000 gallon capacity creosoted frame water tank was erected at Peotone, Ill.

Roundhouse stalls at Centralia, Ill., Clinton, Ill., Amboy, Ill., Freeport, Ill., and Paducah, Ky., were extended to accommodate the new Central type freight locomotives. New 100-ft. turntables, replacing 85-ft. turntables, were installed at Centralia, Ill., Clinton, Ill., and Freeport, Ill.

Work of constructing block signals between Ilsley, Ky., and Princeton, Ky., a distance of 20.5 miles, was commenced. There were 2,408 miles of block signals in operation at the close of the year.

2,335 lineal feet of permanent bridges and trestles were constructed replacing pile and timber bridges and trestles; 1,032 feet of permanent bridges and trestles were filled and 11,893 lineal feet of pile and timber bridges and trestles were rebuilt or replaced by embankment. 2.75 miles of track were ballasted or reballasted and brought up to the present standard.

Additions and Betterments—Equipment:

Twenty-five Pacific type locomotives were added and eighteen locomotives of various types were disposed of, resulting in an increase of seven locomotives. Three Consolidation type freight locomotives were converted into Mikado type freight locomotives and three Pacific type passenger locomotives and nine freight locomotives of various classes were superheated. The increase in tractive power of locomotives for the year was 744,910 pounds.

Seven passenger train cars were destroyed and one sold.

One thousand six hundred and twenty-seven freight train cars were added and four hundred and eighty were destroyed, sold or transferred to other classes, resulting in a net increase for the year of one thousand one hundred and forty-seven cars.

GENERAL REMARKS

Federal control having terminated on March 1, 1920, your Company accepted the provisions of Section 209 of the Transportation Act, 1920, and was thereby guaranteed by the Government an income for the six months beginning March 1, 1920, of not less than one-half of a year's compensation as fixed in the Federal Control contract, subject to increases due to adjustments as provided for in Section 4 of the Federal Control Act.

Approximately twenty per cent was added to your Company's payrolls by the decision of the Railroad Labor Board, which, though rendered on July 20, 1920, was retroactive from May 1, 1920.

To meet increases in labor costs due in part to this decision, increases in costs of fuel and supplies, as well as to provide the six per cent return upon property values as provided in the Transportation Act, the Interstate Commerce Commission, by its decision in the case known as Ex Parte 74, rendered July 29, 1920, but effective August 26, 1920, permitted increases of forty per cent in interstate freight rates in the territory North of the Ohio River and East of the Mississippi; of thirty-five per cent in territory West of the Mississippi; and twenty-five per cent in Southern territory. Interstate rates applying between territories were increased thirty-three and one-third per cent. Interstate passenger fares other than suburban, and rates on milk and cream carried on passenger trains were increased everywhere twenty per cent, and the railroads were granted a surcharge for transporting passengers in sleeping cars equal to one-half of the regular sleeping car fare. Intrastate rates and fares were not increased at the same time or to the same extent as the interstate. State commissions, to whom applications were promptly made for increases in state rates, were in several states without authority to allow increases in passenger fares, and in some states the increases granted in freight rates were less than the interstate advances. By action of the Interstate Commerce Commission, protected in many instances by Federal injunctions, most of these rates were finally advanced to the interstate basis. In only two states, however, were the full advances effective before the end of the year, and in one of the two the increase was not made until October 1, 1920. Generally speaking, intrastate passenger fare increases in the important states of Illinois, Iowa, Indiana and Louisiana were not effective until the end of the year, and advances in freight rates in these and other states were only partially effective.

The marked decline in traffic during the final months of the year prevented your road from earning the sums hoped for from the rate increases. To meet this situation expenses were promptly reduced to correspond with the decline in traffic so far as this could be done consistently with safe and efficient operation.

Prior to September 1, 1920, through freight traffic was moved over the Yazoo and Mississippi Valley Railroad between Asylum, Miss., and West Junction, Tenn., under a trackage agreement covering that part of the line between Asylum, Miss., and Gwin, Miss. On September 1 an agreement was made extending this arrangement to the line between Gwin, Miss., and West Junction, Tenn., in lieu of the traffic arrangement previously existing between the two Companies.

An equipment trust agreement known as "Government Equipment Trust No. 33" was executed during the year to cover the minimum purchase price of three thousand five hundred coal cars allocated to your Company by the Director General of Railroads, and $9,117,000.00 of notes of your Company bearing interest at six per cent per annum were delivered to the Government under this agreement. Additional notes will be issued later to cover the purchase price of one hundred fifty coal cars received subsequent to the execution of the trust agreement and to provide for the balance of the purchase price on the original three thousand five hundred cars.

Your Company contracted for the purchase of seventy-five locomotives, fifty-five passenger train cars and one thousand five hundred fifty freight train cars to cost approximately $13,515,000.00. To provide funds for the purchase of this equipment there was issued during the year "Illinois Central Equipment Trust, Series F," amounting to $8,107,000.00 and there was advanced by the United States Government under the provisions of Section 210 of the Transportation Act $4,440,000.00, your Company giving its notes maturing in equal amounts annually between 1921 and 1935, bearing interest at the rate of six per cent per annum, to secure the loan. The balance of the purchase price of the equipment was paid in cash by your Company.

The number of stockholders as shown by the books of your Company at the close of the year was 13,645, as compared with 11,966 last year.

The Board desires to express its appreciation to the officers and employees for their loyal and efficient services during the past year.

By order of the Board of Directors.

C. H. MARKHAM,
President.

Railway Officers

Financial, Legal and Accounting

E. R. Belt has been appointed auditor of disbursements of the St. Louis-San Francisco, with headquarters at St. Louis, Mo., effective June 6.

Operating

A. A. Sims has been appointed assistant to the superintendent of transportation of the Southern Pacific with headquarters at Houston, Tex., effective July 1, succeeding C. L. McManus, deceased.

G. H. Minchin, assistant superintendent of the Illinois division of the Atchison, Topeka & Santa Fe, with headquarters at Chillicothe, Ill., has been appointed trainmaster on the Missouri division, with headquarters at Marceline, Mo.

B. S. Tobias, trainmaster on the Panhandle division of the Atchison, Topeka & Santa Fe, with headquarters at Wellington, Kan., has been appointed chief dispatcher, with the same headquarters, succeeding C. J. Wells, who has been assigned to other duties. The position of trainmaster has been abolished.

Traffic

T. D. Geoghegan, traffic manager of the Gulf, Mobile & Northern, with headquarters at Mobile, Ala., has resigned, effective July 1.

W. M. Organ has been appointed general live stock agent of the Chicago Great Western with headquarters at Chicago, Ill., effective June 15.

Golder Shumate, freight traffic manager of the Baltimore & Ohio, with headquarters at Baltimore, has been appointed general freight traffic manager for the system with the same headquarters. **O. S. Lewis,** general freight agent at Pittsburgh, succeeds Mr. Shumate. **W. W. Blakely,** assistant general freight agent at Pittsburgh, has been promoted to general freight agent with the same headquarters, and **A. L. Doggett,** division freight agent at Youngstown, Ohio, takes Mr. Blakely's place. **C. H. Pumphrey,** district freight agent at Philadelphia, succeeds Mr. Doggett at Youngstown. **Samuel House,** assistant general freight agent at Baltimore, has been appointed general freight agent with office at the same place. **George Harlan** has been appointed assistant general freight agent, and **J. L. Hayes** division freight agent at Baltimore. **P. S. Phenix,** industrial survey agent at Baltimore, has been appointed division freight agent at Cumberland, Md. **E. Jordan** and **J. R. Brown** have been made division freight agents at Charleston, W. Va. **Samuel Strachan** has been appointed assistant to the general freight traffic manager at Baltimore, Md.

Mechanical

J. McDonough, master mechanic of the Atchison, Topeka & Santa Fe, with headquarters at Fort Madison, Iowa, has been transferred to the Illinois division, with headquarters at Chicago, succeeding A. L. Beardsley, who has resigned on account of ill-health.

Engineering, Maintenance of Way and Signaling

J. N. Olson, assistant engineer of the Gulf lines of the Atchison, Topeka & Santa Fe, with headquarters at Galveston, Tex., has been transferred to the office of the chief engineer, with headquarters at Chicago.

Obituary

Frank E. Teetshorn, chief train dispatcher of the Green Bay & Western, died at Green Bay, Wis., on June 27.

W. A. Ballard, president of the New Jersey, Indiana & Illinois, died at his home in South Bend, Ind., on June 30, after a long illness.

JOHN F. WALLACE

John Findley Wallace, of New York City, consulting engineer, and chairman of the Chicago Railway Terminal Commission, died suddenly at a hotel in Washington, D. C., on July 3. He had been in Washington to testify before the Senate Committee on Interstate Commerce in connection with its railroad investigation. Mr. Wallace was one of the most prominent engineers in the United States, having had an extensive experience not only on railroads in various parts of the country and abroad, but in other lines of engineering activity. He was born at Fall River, Mass., on September 10, 1852. He entered railway service in 1869 as a rodman on the Carthage & Quincy. He was engaged in engineering work on the Rockford, Rock Island & St. Louis, the Peoria & Farmington, the Iowa Central, the Atchison, Topeka & Santa Fe, the Chicago, Madison & Northern and the Illinois Central. This service covered most of the period to June 1, 1904, although he was for a time engaged in private practice. On the Illinois Central he was successively engineer of construction, chief engineer (for five years), assistant second vice-president, assistant general manager and general manager.

On June 1, 1904, he was appointed chief engineer of the Isthmian Canal Commission and he also became vice-president and general manager of the Panama Railroad & Steamship Line and a member of the Isthmian Canal Commission. From October, 1905, to May, 1906, he was confidential adviser of the president of the Chicago & North Western. In June, 1906, he became president of the Electric Properties Company and also president and chairman of the board of directors of Westinghouse, Church, Kerr & Co. He left the Westinghouse companies in 1914 and has since been engaged in consulting work on numerous large enterprises. He was vice-president of the Kansas City, Mexico & Orient and of the Northern Colorado Power Company. Since 1914, he has been chairman of the Chicago Railway Terminal Commission and has acted for the City of Chicago in negotiations in contract ordinances involving relations with the railway companies serving the city.

Among the notable works with which Mr. Wallace's name is connected are the terminals of the Illinois Central built for the Chicago World's Fair of 1893, and the present Chicago & North Western passenger terminal in that city. At the age of 24 he made for himself a reputation by his work in rock excavation in the upper Mississippi river, where he was assistant United States engineer. He prepared the construction organization for the building of the Panama Canal. He was the first president of the American Railway Engineering Association. He was for years prominent in the American Society of Engineers and was president of that body in 1900.

FORTY CENTS A PLATE is the cost of a good noon-day meal at a lunch room which seventeen shop foremen of the New York, New Haven & Hartford have established for themselves at Van Nest, New York City; and at that price they have accumulated in two and a half years a reserve fund of about $500. Van Nest is not well provided with restaurants and so these men got the company to give them an old passenger car and they fixed it up as a dining car (without trucks). The company furnishes hot water and gas. They have a woman cook, and, with a present membership of 40 (foremen and clerks) and an average daily company of eaters of 26, they are maintaining the establishment without difficulty. The woman reporter of the New York *Evening Post*, who gives these facts, says that this unpretentious "dining car" is beautiful with rosebushes, and that the odor from the kitchen is "savory."